RAILROAD GAZETTE

FRIDAY, AUGUST 22.

CONTENTS.

Floating a 523-ft. Bridge Span.

Last Tuesday the main channel span of the Ohio River bridge of the Ohio Connecting Railway near Pittsburgh was placed on its piers. This span is 523 ft. long, 65 ft. deep and weighs about 1,000 tons. The bottom chord is 75 ft. above the water level, making the total height of the structure 140 ft.

This structure was erected along shore and floated out and dropped into place, no falseworks of any kind being used between the piers. The total mass floated, including bridge span, false work and barges, weighed a little less than 2,000 tons, perhaps 1,800.

The actual operation from the time the blocking was knocked from under the false works, leaving them clear of the piles, to the time when the span rested on its seat on the piers, occupied about 11 hours. The boldness and magnitude of this work, the simplicity of the means used, and the celerity and economy with which it was carried out make it one of those deeds for which American engineers are famous and of which they may all be proud.

In the *Railroad Gazette* of June 20, 1890, the location and the superstructure of the Ohio Connecting bridge were described. It will be remembered that the main span is over the channel north of Brunot's Island. A dam below the island makes slack water in this channel except in times of freshet. The conditions which led to the plan of erecting the bridge without obstructing the channel are common to all parts of the Ohio River, but the plan here adopted could be used only when a uniform stage of water can be relied upon to float the work at a practically uniform height and without grounding. The immense coal traffic of the Ohio is carried on by great tows of barges. These tows accumulate until a proper stage of water is reached, and then are rushed down the river. It is not only necessary to leave a free channel for them, but when they are going down in great numbers they become extremely dangerous to any temporary structures in the channel. In the case of the Ohio Connecting bridge several expedients were suggested for avoiding these difficulties and dangers. The most promising one was to build crib piers, to carry Howe trusses, on which to erect the span; but when this was carefully studied it was decided that it would still restrict the channel too much and at best would be expensive. Eventually this plan was abandoned for the one adopted, which will now be briefly described. We shall in an early issue give illustrations of the falsework and of various stages in the operation of erecting and floating the span.

Along the shore of the island, beginning about 500 ft. below the bridge site, where a certain depth of water could be relied upon, piles were driven in bents to make the usual sub-staging. There were five piles in each bent, and the bents were placed under the panel points of the span. The piles were cut off 16 ft. above the pool datum (mean water level). On the piling a trestle was erected about 57 ft. high, making the top of the trestle 73 ft. above the water. The base of the rail is 79 ft. 7¾ in. above pool datum. The trestle was much battered, the spread being 32 ft. at the top and 80 ft. at the bottom. Each bent had five posts, corresponding to the piles below. These bents were 26 ft. 1¾ in. apart. The posts were of 12-in. × 12-in. timber. Each alternate bay of the pile sub-staging was spanned by 20-in. iron I-beams, in pairs. Five pairs of I-beams were used for each bay, a pair of them over each pair of piles. On these I-beams the trestle was carried, and on the trestle the span was erected in the usual way. When the span was erected it was floated by means of coal barges run in between the pile bents, a barge being placed in each alternate bay under the I-beams. These barges were 26 ft. by 130 ft. and about 8 ft. deep. Stagings were built in these barges to carry the falsework. When the time came to float the structure water was pumped out of the coal barges until they raised the I-beams supporting the trestle clear of the piles. Then the falseworks and span were carried on nine barges drawing about 27 in. of water, and it only remained to haul the barges out into the stream clear of the piles, turn the mass parallel with the axis of the bridge, and tow it into position between the piers. This was successfully accomplished last Tuesday.

The structure was lifted clear of the piles and began to move out at 8:50 a. m. At 11:15 it was in the stream and stopped long enough to put in bracing between the barges. Before the start was made stringers had been put in from barge to barge across the bows. When they cleared the piles other stringers were put in across the sterns; and between the barges at the ends of the structure intermediate stringers were placed. The trestle had already been well braced in all directions, a very substantial system of diagonal bracing being placed at the foot of the trestle. Additional rigidity was secured longitudinally by the use of iron tie rods.

The mass was moved by winding engines located on two barges made fast to the barges supporting the structure at each end, which hauled in lines carried to shore or to piles in the stream. Progress was very slow, for the lines had to be often shifted, as the position of the structure changed, and, of course, no body of men can have enough practice in this kind of work to become very skillful at it. Precautions were taken also to keep out back lines to control the motion of the mass in every direction. Fortunately but little wind was blowing and there was no difficulty in handling the structure.

At 7 p. m. the south end of the span was in position over its seat, and about 20 minutes later the north end was in position. At this time the span floated about 26 in. above the top of the pier. Plugs were then taken out of the barges to admit water, and the span settled slowly to its bearings. Bars inserted in the anchor-bolt holes served to guide the shoes to their final position.

The trusses were not originally designed to be erected in this way, but when this plan was adopted no change in design was made. Temporary wooden struts were put in at the sub-system panel points (midway between main panel points) as the trestle bents were spaced to come below these as well as below the main panel points.

Although this plan was undoubtedly more expensive than the ordinary one of building falsework in place, the increased cost was not so much greater as might be supposed. The barges used were standard coal barges and will be sold for that service. The I-beams which carried the trestle are available stock for other uses, and the tie-rods used in the trestle are standard rivet iron which will be returned to the works. On the whole, the feat was not only a bold and brilliant one, but it will stand the final test of all good engineering; it was not wasteful.

The reader who recollects the method of erecting the Hawkesbury bridge as illustrated and described in the *Railroad Gazette* of Aug. 10, 1888, will notice a fundamental difference between that work and the work at the Ohio Connecting bridge. Each span of the Hawkesbury bridge was erected on a pontoon which rested on piles. On this pontoon the falsework and span were erected and the pontoon was then floated off at high tide and the span dropped into place by the falling of the tide as well as by admitting water to the pontoon. In this case the spans were 415 ft. long and the bottom chord was 46 ft. above the water. This work was done by the Union Bridge Co. A similar plan was followed by the Keystone Bridge Co. (after Mr. Strobel's designs) with a bridge at Jacksonville, Fla., last fall. In that case four spans of 250 ft. each were built on single pontoons and floated into place. The bottom chord was 10 ft. above the water. Here also the tide was used to lower the spans to their seats. In both these instances the pontoons were used as measures of economy, the bridges being over deep tidal streams with muddy bottoms, in which it would have been costly if not impracticable to build falseworks. In the case of the Ohio Connecting bridge the plan was adopted rather as a matter of expediency than of economy.

The credit for this last and most remarkable instance of floating a span to place after erecting it must be given to Mr. C. L. Strobel, Chief Engineer of the Keystone Bridge Co., who designed the bridge and the plant for erecting it, and who personally superintended the work of Tuesday. Much credit must also be given to Mr. George Buchan and Mr. F. J. McCain, Superintendents of Erection for the Keystone Bridge Co. Mr. Buchan was in charge of the work of erecting and floating this span. He was assisted on Tuesday by Mr. McCain, who had charge of the similar work at Jacksonville, and who assisted Mr. Strobel in moving the Wells street drawbridge in Chicago.

The New York Central Strike.

The total number of men who struck on the New York Central & Hudson River Railroad Aug. 8 is now estimated by the officers at from 1,500 to 2,000. Some of the men returned to work voluntarily on the following day so that an accurate statement cannot be made. The local and suburban passenger trains running into New York City did not all resume their trips till the 17th. On the 16th the switchmen at Buffalo struck because one of their number had been set at work in the place of a striker. According to the press reports 300 men, and according to the officers of the road 70, quit work, and the handling of freight at the Buffalo yards was entirely suspended, though passenger trains were not seriously interfered with. Reports since Sunday from Buffalo are meagre, but it does not appear that the blockade in the yard has been cleared, or the situation materially improved.

The Knights of Labor have continued to profess cheerfulness, and have regularly contradicted the statements of the road to the effect that the freight work was being rapidly got into a normal condition. On Monday of this week the road announced its readiness to receive freight at all stations, but the accumulated cars in the large yards were still hindering the movement of trains very much. Statements were frequently made of the number of trains sent out from New York and from Albany, but no comparisons with the ordinary volume of traffic were given, and the number of cars moved seems to have been much below the average.

The officers of the Knights of Labor have had numerous conferences with the leaders of the firemen's and switchmen's brotherhoods, and are evidently trying to get the latter to join them in fighting the road, but thus far apparently without success. Mr. Sargent, of the Firemen's Brotherhood, had an interview with Mr. Webb, of the New York Central, on Tuesday. Mr. Webb says that he received Sargent not as chief of the brotherhood, but simply as Mr. Sargent.

At Albany on Saturday and Sunday the detectives, of whom the railroad company had at that point about 600, shot several persons among the crowd of strikers and others who lined the tracks. The road runs through the streets of the city, and the detectives were on the tops of moving freight cars. The victims are said to have been innocent bystanders, and one of them was a woman on her own premises. The detectives say they fired into the crowd to avoid being overpowered by the mob, while on the other hand it is claimed that the shots were fired without provocation. A number of detectives have been beaten or stoned, and 15 of them were in the hospital car on Sunday. Three were arrested. It seems that the detectives are not sworn in as officers of the law, and the civil authorities at Albany are apparently jealous of them. The officers of the road say that the detectives were engaged because the local authorities, when applied to, failed to provide decent protection for the property of the company. The sheriff appointed strikers as deputies to guard the railroad company's property.

A collision at Melrose, on the Harlem Division, on Saturday night resulted in an engine without a tender running uncontrolled 6 miles to the Grand Central Station, but no harm was done. One account says that all the employés involved in this collision were old hands, and another says that a new switchman failed to show a proper danger signal. Several slight collisions occurred in the freight yards at New York and Albany, but it does not appear whether they were anything very unusual. There have been several instances of violence at New York and other points besides Albany. Passenger travel, including large numbers going to and from the Grand Army Encampment at Boston, has been considerably disturbed by the strike, even the roads through Canada getting a heavy traffic between New England and the west. Freight traffic has been heavy on the Lehigh Valley and other trunk lines, and the Lake Shore has discouraged eastbound shipments from Chicago for the New York Central. The New York, Chicago & St. Louis, which has eastbound connections at Buffalo outside the city, has taken a largely increased volume of freight. It does not appear, from the reports, that the Central has directly diverted much freight from its own lines to others, but the press reports have much to say about the "displeasure" of the strikers at the action of other roads handling Central freight.

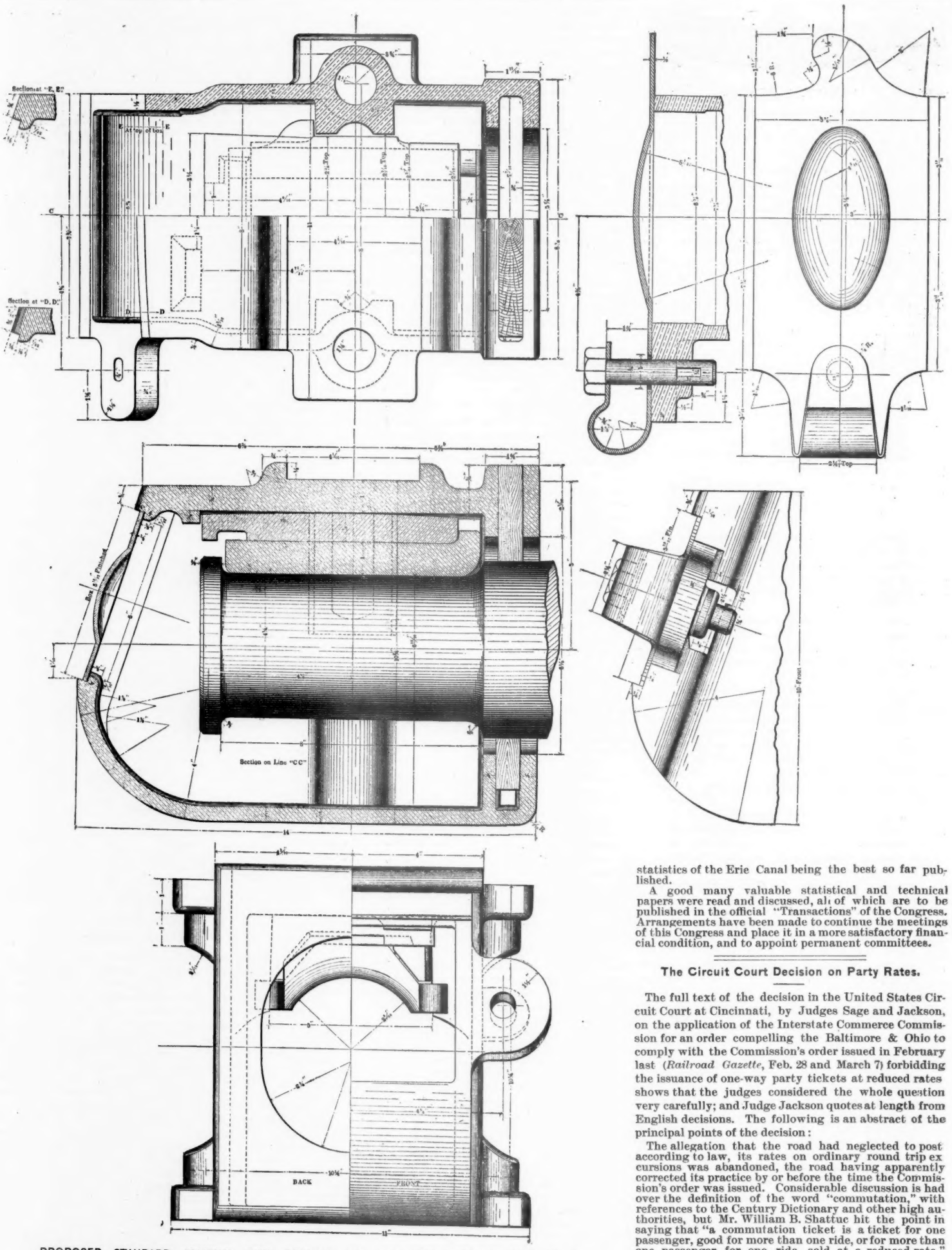
The Quincy Accident.

A northbound express train on the Old Colony road was derailed near "President's Bridge," in Quincy, Msss., on the afternoon of Aug. 19, about 1 o'clock, and 19 passengers and the fireman were killed and the engineer and over 30 passengers injured. The train consisted of an engine, baggage car, smoking car, a drawing-room and four passenger cars. It is said to have been running at 30 miles an hour. At a point where track repairs were in progress the locomotive jumped the track and ran to the right sufficiently to let the next three cars run by it. The fourth car, containing about 70 passengers, struck the locomotive and lodged upon it in such a way that escaping steam from the blow-off valve at the bottom of the fire box scalded the passengers; and it was in this car that most of the fatalities occurred. It is said that the locomotive was derailed by a track jack, which the repairers had carelessly left fastened to the rail when they went to dinner.

The International Canal Congress.

The fourth session of this body was held at Manchester, England, between July 28 and Aug. 1. Representatives from about all of the European states were present, but none from this country or Canada, though Mr. Menocal sent a paper on the Nicaragua Canal, in which he estimated the tonnage likely to pass through it at 7,000,000 at first, increasing to 37,000,000 soon; as the tonnage passing Detroit during the season of navigation is estimated at 36,000,000 tons, there seems no reason why this should not be accomplished. Mr. Sanford Fleming read a paper on the canals of Canada, which are only prevented from becoming great arteries of trade by their insufficient depth and small locks.

The congress was divided into four sections, dealing with the technique of canal and river improvements, their maintenance and working, statistical matters and their economic aspect. The papers had all been printed beforehand, several in English, French and German, so



PROPOSED STANDARD JOURNAL BOX, BEARING AND LID FOR 60,000-LB. CAR.—Fig. 1.

that the time of the congress was mostly occupied in discussions and passing the following resolutions:

"1. Owing to the low cost of construction and maintenance of water-ways, they form a valuable means for transporting large masses at cheap rates, and should be the object of earnest attention on the part of all parties concerned and of the state.

"2. In order to secure this, a cheap, thorough going transport system, with uniform dimensions, is essential.

"3. The existence and development together of railroads and water-ways are desirable, (*a*) because those two means of transport are the complement of each other, and ought to contribute, each according to its special merits, to the public good; and (*b*) because from the broad point of view the industrial and commercial development which will result from the perfecting of means of communication must, in the end, profit both the railroads and water-ways.

"4. The great value of water-ways to the country at large, and the fact that they are feeders of and supplementary to railroads, justifies the state and public bodies in assisting the construction and maintenance of water-ways of uniform dimensions, so as to encourage through traffic at low rates."

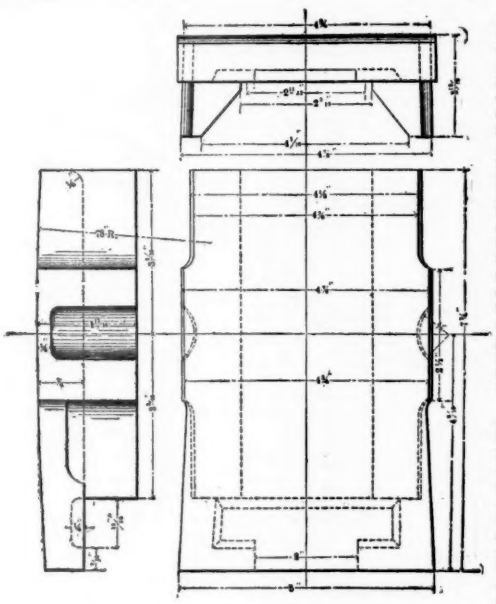
To a recommendation that the governments of the different countries publish exhaustive statistics relating to navigable water-ways, Mr. Bateman, of the British Board of Trade, objected that his government was not likely to accept the recommendation, the policy of Great Britain, as is shown in railroad returns, being to repress exhaustive statistics. It was apparently hoped, however, that other governments would publish such statistics, which have never yet been systematically and generally gathered, we believe, in any country, the statistics of the Erie Canal being the best so far published.

A good many valuable statistical and technical papers were read and discussed, all of which are to be published in the official "Transactions" of the Congress. Arrangements have been made to continue the meetings of this Congress and place it in a more satisfactory financial condition, and to appoint permanent committees.

The Circuit Court Decision on Party Rates.

The full text of the decision in the United States Circuit Court at Cincinnati, by Judges Sage and Jackson, on the application of the Interstate Commerce Commission for an order compelling the Baltimore & Ohio to comply with the Commission's order issued in February last (*Railroad Gazette*, Feb. 28 and March 7) forbidding the issuance of one-way party tickets at reduced rates shows that the judges considered the whole question very carefully; and Judge Jackson quotes at length from English decisions. The following is an abstract of the principal points of the decision:

The allegation that the road had neglected to post according to law, its rates on ordinary round trip excursions was abandoned, the road having apparently corrected its practice by or before the time the Commission's order was issued. Considerable discussion is had over the definition of the word "commutation," with references to the Century Dictionary and other high authorities, but Mr. William B. Shattuc hit the point in saying that "a commutation ticket is a ticket for one passenger, good for more than one ride, or for more than one passenger for one ride, sold at a reduced rate." Whether or not party tickets were used before the enactment of the Interstate Commerce Law, and whether they were then regarded as commutation tickets, isheld to be immaterial. Judge Sage admits for the purpose of the present case, that they may be treated as distinct from "mileage, excursion and commutation tickets" mentioned in the twenty-second section of the law; but Judge Jackson holds that the words used in that section are to be taken as general terms, and not to be applied in a rigid technical sense. Section 22 is not a chapter of exceptions to the operation of the main clauses of the act to regulate commerce. The giving of free carriage to indigent persons and to employés, and other things specified, are not unjust discriminations allowed by the law; these clauses are illustrative of discriminations which are not unjust. The section is not exhaustive, and the omission of mention of party rates



Proposed Standard Journal Box, Bearing and Lid.—Fig. 2.

is not significant. Party rates are not obnoxious to the first section of the act. It is true that the railroad company may decide what number shall make a party, and may give a reduced rate to a party of two, but there is no evidence of any abuse in this line heretofore, and the traffic associations, with their control over the roads, are believed by the court to be a warrant against abuse. Moreover, the courts would at once apply a remedy if the principle were abused; and if party rates became so general as to introduce widespread discrimination, the state legislatures would promptly reduce individual fares. The history of railroad passenger travel for the past forty years shows a constant tendency in the reduction of regular (individual) rates as a result of the previous introduction of mileage, excursion and commutation tickets.

There is no unreasonable preference granted one passenger over another. A person on a party rate ticket may sit in the same seat with one who has paid full local fare, but this is in no sense different from the case of a passenger on a local ticket sitting beside one who rides on a thousand-mile ticket. The objection that a speculator may buy a party ticket and pick up individuals to fill out his number is thrown aside as trivial, and the fact that a carload of 60 passengers riding on a single ticket are certain to pay their whole fare into the treasury of the company, while in another carload of 60 passengers the conductor may steal some of the fares or fail to collect them, is regarded by the court as important.

The Baltimore & Ohio introduced evidence to show that the party rate tickets issued by it are not used for speculative purposes and the evidence of railroad experts generally was that party rate tickets are much less liable to abuse than ordinary single tickets; but even if tickets for parties of 10 are liable to the abuses suggested, that fact does not affect the proper construction of the law. The testimony establishes the fact that party rate tickets secure patronage that yields large revenue, and that withdrawal of those tickets destroys that business (mostly theatrical) as it cannot afford to pay full rates.

When we speak of "similar circumstances and conditions" we must consider the circumstances and conditions affecting the business interests of the carrier as well as the narrow question of the accommodations granted the passengers or the distance they ride. The objection that party rate tickets are obnoxious to the fourth section has no weight after one has fully considered the previous arguments.

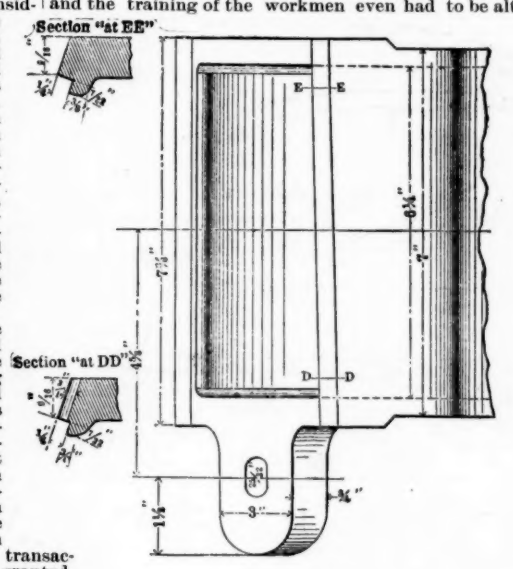
The right of a railroad to make and collect reasonable charges for transportation has been settled by the recent decision of the Supreme Court in the case of the Chicago, Milwaukee & St. Paul vs. the State of Minnesota, and of this right a company cannot be deprived without due process of law. It is not disputed that party rate tickets are reasonable in price, considered by themselves, and there is no complaint that the highest local rates on defendant's road are other than reasonable, considered by themselves. The act to regulate commerce does not undertake to deal with rates further than to declare the general principle that they shall be reasonable and not unjustly discriminating. Beyond this the common law right is not restricted. Round trip excursion tickets are often issued to go over one road and return over another. Any distinction between these and one-way party rates is a distinction without a difference. Judge Jackson says: "When this court is called upon, either by the Commission or others, to enforce the law, it is indispensably necessary to show either a case of individual grievance or of public inconvenience." The present case rests upon the alleged undue prejudice against the public using single tickets, but there is no evidence of this.

The judge seems to have overlooked the question of publicity of rates as demanded by the law, saying that the railroads are free to make "special contracts" looking to the increase of business, provided there is no discrimination, etc.; but this argument does not affect the main structure of the decision. There is much discussion of the question whether a single ticket passenger and a party are in competition with each other in any sense, and the conclusion is reached that they are not. In short, the right of applying the wholesale principle in passenger traffic the same as in freight, or the same as in ordinary mercantile transactions is fully upheld. The injunction was not granted, and the suit was dismissed at the cost of the Commission.

Proposed Standard Journal Box and Lid—Letter Ballot.

We show herewith the drawings of the proposed standard journal box, bearing and lid for 60,000-lb. cars, and lid for standard journal box for 40,000-lb. cars, as sent out by Secretary J. W. Cloud of the Master Car Builders' Association with the letter-ballot by which the members are to vote on the adoption of these standards.

The committee submitted drawings for box, bearing and lid for 60,000-lb. cars, and showed how the same lid could be applied to the old standard 40,000-lb box. The lid was of the Fletcher form, of malleable iron, and pivoted above the box. It was decided to have the drawings modified to show the lid pivoted at one side of the box instead of above. Such change has been made in the drawings by the original committee, except that they have shown the pressed steel lid. Figs. 1 and 2 show the box, bearing and lid for 60,000-lb. cars, and fig. 3 shows the lid for old standard journal box for 40,000-lb. cars, as ordered to be submitted to ballot, except in regard to lids which should be of malleable iron. The original drawings of the committee showed the malleable iron lid, and also how the pressed steel lid could be used in its stead; and if this journal box should be adopted as standard, the drawings, when issued in the report of proceedings, will show the malleable iron lid of the same dimensions as this pressed steel lid, and similarly pivoted, as standard; and will also show how the pressed steel lid may be used as an alternative when desired, as per the drawings. As the essential points are the dimensions of the lid and the arrangement as to pivoting, it was not thought advisable to delay the letter ballot for the purpose of changing the drawings.



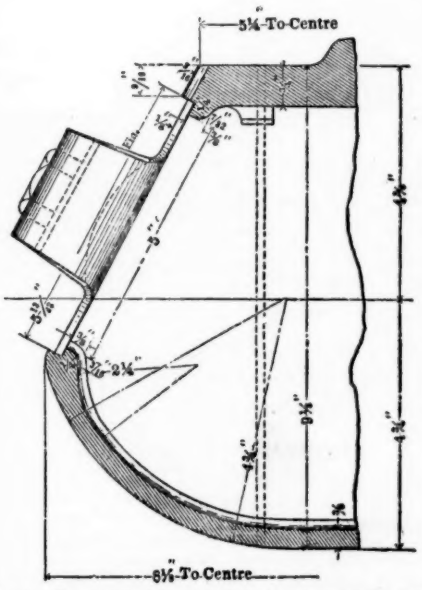


Fig. 3.—Proposed Standard Lid for Journal Box of 40,000-lb. Car.

Changes in Machine Tools Following a Change from Wood to Iron Construction.

The following is the interesting introduction to a series of articles on Shipyard Machine Tools in a late number of *Engineering:*

"Few industries have developed with such rapidity, during the last 25 years, as that of iron shipbuilding. Its beginning, of course, was much earlier, for it is over a hundred years since canal barges were first built of iron. But it is now just about a quarter of a century since it became obvious to every one interested in shipping that the trade of shipbuilding in wood was threatened by a kind of revolution, and was likely, ere long, to be replaced altogether by the business which used iron chiefly as the material of construction. Soon there would hardly be such a thing as a wooden craft of any magnitude in existence. Iron vessels could be built much more rapidly, at much lower cost, and their superiority in nearly every respect was incontestable. However slow the old wood shipbuilders might be to recognize iron as a suitable material, still it was, in the first instance, from their ranks that the early building in iron proceeded. It was not so much a new trade that was springing up, it was rather the change in the material that involved a difference in the mechanical processes of the craft.

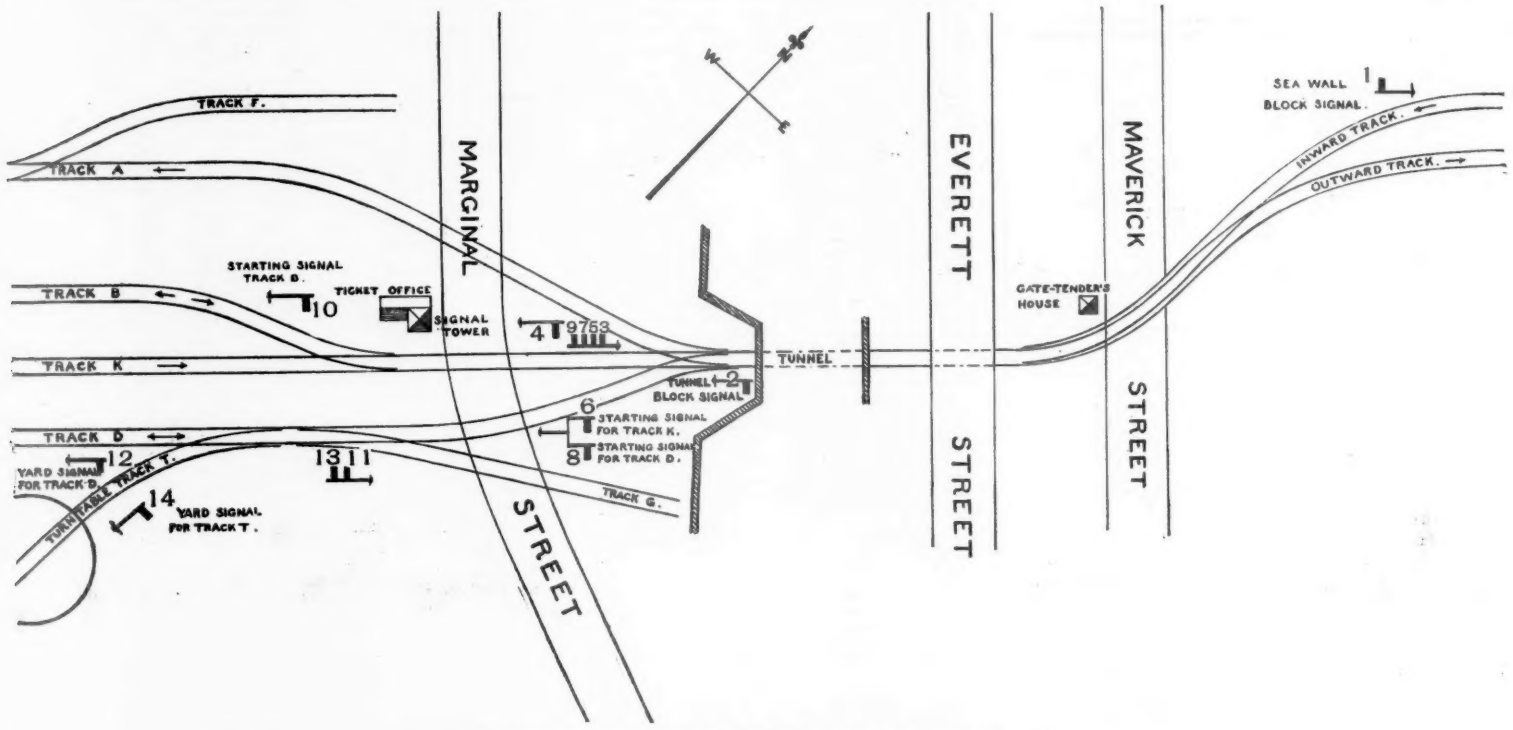
"Most of the shipyards in existence some 35 years ago built in wood only; and it was about that time that our shipwrights began to see the change that was coming into their trade. Many of them were sagacious enough to understand that if they were to continue building ships at all they must be prepared to make their hulls of other material than timber. Hence, a gradual transformation in this industry began to set in. Oak had to give place to iron. Other craftsmen, and altogether different tools, had to be employed. And one of the first and most important consequences of this great revolution was, of course, an enormous extension of works for the manufacture of malleable* iron. Railways had already given a marvelous push to this great industry. Here was a new source of demand. But the development of the iron trade is not our subject. What we design to do is to show the rise and development of a species of machine tools which have been called into existence by the use of iron and steel as the materials for the construction of ships. These tools did not appear until evolved gradually by the needs of the time. Iron was not to be cut and carved with the same facility as timber. The tools employed, the conditions of working and the training of the workmen even had to be altogether of a different kind. Means were needed for shaping and otherwise manipulating this harder and more refractory material. Tools were wanted for shearing plates and angle bars, for punching and drilling the holes, for curving, bending, planing and welding.

"Long prior to this there had been machine tools of a kind, which were used for boilermaking and similar iron structures; and these, or some modification of these tools, were first used in iron shipyards—just as the boilermakers were naturally the class of workmen first set to work to construct iron hulls. And for a time these machines answered fairly well, while the plates were limited in thickness and area. At this time, when high pressures of steam were never thought of, boilers were seldom made of plates thicker than ⅝ in. Thinner could not easily be calked and thicker could not easily be worked. Moreover, the iron works then existing had not the plant for rolling thicker and larger plates. Such plates as they made were of necessity narrow and short. Consequently there were very few machines constructed to punch or shear plates thicker than ½ in., and the plates being narrow, the gullets in these punching tools were seldom deeper than 12 in., or 15 in. at most.

"But the malleable iron manufacture was meanwhile making rapid strides, and was becoming able to meet the demand that was constantly arising for plates of larger scantling, and especially of greater thickness. Soon the shears, punches, and rolls in use were found to be quite inadequate for dealing with such increased dimensions of plates and other sections of iron. Aspiring naval architects had to restrain their wishes. It was of little use to order plates wider than 2 ft. if the gaps of the machines would not admit the plates further than 12 in. If wider plates were used, then the holes in the middle that could not be reached by the punch, must of necessity be drilled; and that was too expensive a process at that time. It became necessary to have machines with deeper 'gullets' at the punching ends, and of relatively greater strength to bear the strain of punching larger holes through thicker iron. Hence the demand that began to arise for much larger and stronger tools, a demand which about the year 1860, and for a few years thereafter, could only be very imperfectly met by our toolmakers at that time. Many machines of faulty and ill-considered design were produced. The existing makers were not able to keep pace with the exigencies of the time or to meet the requirements in an adequate manner; and indeed, the buyers of such tools generally were far from knowing the extent of their own wants, much less foreseeing what they should have to deal with in the near future.

"Some of the larger shipbuilders, who were also engineers, essayed to make machines for their own use. These constructed very powerful machines which answered their purpose in a way, albeit often hurriedly

* The writer evidently uses the word "malleable" in the sense of "ductile."



EAST BOSTON YARD—BOSTON, REVERE BEACH & LYNN RAILROAD.

Interlocked Switches and Signals, Erected by the National Switch & Signal Company.

got up, but they were often conspicuous more for their cumbrousness than for any special merit in design. Some of these ponderous monsters may still be seen in some of the older concerns, where their room is more valuable than their company. But they did useful work in their day. As a rule, the machines made by toolmakers at that time were much too weak for their work. Makers had little, if any, data to guide them in their proportions. There was generally too much cast iron in their composition, and too little steel, wrought iron, or brass. The usual consequences followed. Breakdowns were innumerable; and the tools of that period that have survived are either relegated to some out-of-the-way corner of the yard where they have little, if anything, to do, or they are in the possesson of the dealers in old machinery.

Interlocking at East Boston.

The Boston, Revere Beach & Lynn Railroad has just put in an interlocking system of signals at its East Boston yard and tunnel, where, on account of lack of room and of heavy increase in summer traffic, there are required several hundred train movements daily, there being 70 arrivals and departures of trains week days, and 50 on Sundays, each arrival and departure necessitating 8 or 10 train movements. The interlocking plant of 12 levers, which has been carefully planned, was installed by the National Switch & Signal Co., under the direction of its vice-president, Prof. C. Herschel Koyl, the inventor of the parabolic semaphore, which has been adopted by this road as its standard semaphore signal.

The accompanying diagram (not drawn to scale) shows the location of the tracks and switches from the "sea wall" east of the tunnel to the East Boston station and ferry slip (not shown), west of Marginal street (a grade crossing). As will be seen, the inward and outward tracks are intervolved for some distance either side of the Maverick street crossing, in order to bring the switch as near as possible to the signal tower. In the ordinary operation of the road the west-bound trains (inward) arrive on track *A* or track *B*. The east-bound trains (outward) usually depart from track *K* or track *B*, but sometimes from track *A*. Track *D* is used for storing spare cars.

The tracks from which trains depart are governed by full-sized semaphore starting signals for outward trains and dwarf semaphores for arriving trains. In addition to these there are two semaphores, one at the west end of the tunnel (2) and one at the sea wall (1), which besides their usual office are made to act as automatic block signals, as hereinafter described. Any one of the starting signals (4, 6, 8, 10) standing at safety, provided the tunnel block signal, 2, is also at safety, gives an absolute right of way over opposite trains for any train leaving the track controlled by its starting signal; while signal 1, if at safety, gives an absolute right of way to west-bound trains through the tunnel and to whichever track (west of the tunnel) the dwarf signal (3, 5, 7, 9) stands right for. The dwarfs are arranged so that the upper blade shows the extreme left-hand track and the lower blade the right-hand track, with the intervening tracks in their order. All signals are arranged so that the blade shall be seen by the engineer extending from the right-hand side of the post.

The operating levers are interlocked mechanically and electrically. The section of single track between the yard and the sea wall is equipped for a track circuit, and is so used. The electrical connections at the rail joints are thin ribbons of sheet copper, one on each side under the angle splice bars, each ribbon being punched with oblong holes for track bolts and crimped at the ends beyond the splice bars to allow for contraction and expansion, the ribbons also being secured to the rail by a ⅝ in. copper rivet, running through each ribbon and the web of the rail, and headed over solid on both sides. In addition to these appliances, electric annunciators and indicators are placed in the signal tower and are automatically operated by both inward and outward trains by means of a track instrument devised by Superintendent C. A. Hammond. The outward trains give their signal as the train passes the track lever, which is just beyond the fouling point at sea wall, and the inward trains give their signal about a mile east of the tunnel. An electric tell-tale also shows the tower-man the position of the sea wall block signal, whether at safety or danger. In addition to the automatic signals an independent electric signal is provided, to be operated by the gate-tender at Maverick street, by which he announces to the tower-man the approach of inward trains as well as the departure of outward trains beyond the fouling point. A device has been provided by means of which the sea wall block signal is automatically tripped to danger as a locomotive going west (inward) passes it. When the signal is put at safety an electric bell in the tower is set ringing, and rings continuously until the train trips the signal to danger. When an inward train has reached the insulated section of the track, all further movement of signals and switches is prevented until the train has cleared the switch at the west end of the tunnel.

A feature of the business on this road consists in a double-train service, morning and afternoon, local trains arriving in the morning on track *B*, followed by an express train which arrives on track *A* two minutes or less after the arrival of the local train, both trains delivering passengers to the same boat. In the afternoon the movements are reversed, the express trains leaving from track *K*, followed two minutes later by a local train from track *B*. It was deemed absolutely necessary, therefore, that the sea wall signal should be tripped to danger automatically by every west or inward bound train and that the engineer should *see* this signal change from the previous position of safety to the position of danger, thus protecting his train against a following train. The tower-man must again set the lever for this signal to danger before he can give safety to a following train; but he is prevented from doing this until the electric lock, operated by the first train while on the section of the track covered by the track circuit, is released. At first the tripping device was placed directly opposite the signal post; but it was found that the movement of the locomotive, even at a moderate speed, was too rapid for the engineer to see the movement of the signal without being obliged to look back for it, which, of course, would take his eye from the track at the very place where he should exercise the most vigilance, namely, while approaching the grade crossing of Maverick street and the curve leading to the tunnel. It was therefore decided to place the tripping device about the length of the locomotive east of the signal post, and to make that point the limit of the tunnel block, the orders given to the engineers being to stop unless safety is shown by the sea wall signal up to the said limit, which is marked by a painted post. If the signal be thrown to danger at any time before the locomotive has reached said limit post the engineer must stop his train at once.

The interlocking apparatus was put into successful operation on the first day of the new summer time-table (June 29), and has given excellent results thus far. Heretofore trains entering the tunnel have been governed by the old-fashioned ball signal, which, however, had no effect on rights of way, the meeting point of trains being absolutely fixed by the time-table.

Since the interlocking signals have been in use, while equal or greater safety has been secured in the operation of the tunnel, considerable saving of time has been effected by allowing the tower-man to make use of every opportunity of expediting the movement of trains, giving the right of way to whichever train could clear the tunnel without delaying its opposite train. A comparison of the records of arrivals and departures, this year and last, shows that in the aggregate nearly two hours of time is saved daily in the handling of trains in the East Boston yard, and that the trains thus "get around" with the least possible delay, and without any delay arising from the necessarily rigid and uniform application of the ordinary rules governing right of way and preference of trains.

Safety Chains for Passenger Cars.

We illustrate herewith the proposed arrangement of attachment, with spring for safety chains, as described in the letter ballot by which the members of the Master Car Builders' Association are to vote on the adoption of standards. As our readers know, the proposed standard is for chains with links made of ⅞-in. iron, each link to be 1½ in. wide inside. The proposed standard height for drawbars is 35 in. from top of rail to centre of drawbar when car is loaded; this is the present practice in a large majority of cases.

The letter ballot embraces three other subjects:

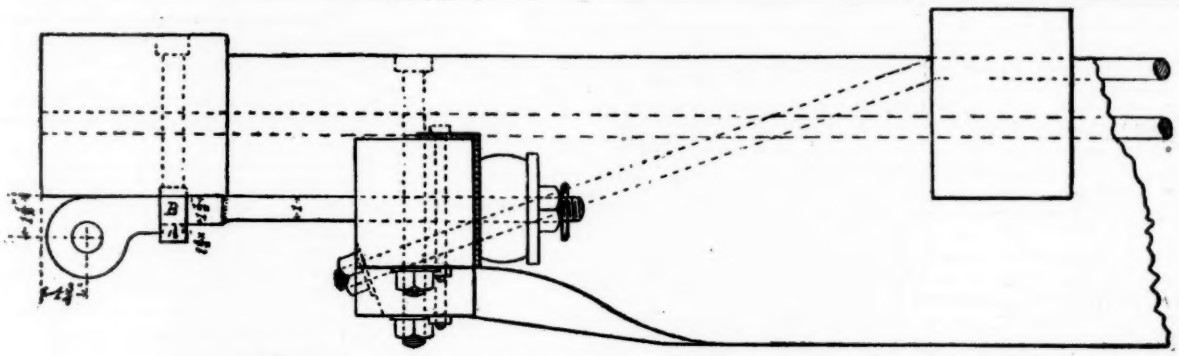
1. A plan is proposed for loading logs and poles on cars, describing the point of support for such lading where it rests upon or extends over two or more cars. A plan for a rack for platform cars for carrying bark is also shown. The proposed rule prescribing the width and height for loads of logs or poles has been abandoned, because most railroads prescribed their own cross-section limits for loading.

2. Members are asked to vote on the adoption of 40 degrees as the lateral angle which brake-beam levers should make to the vertical longitudinal plane of the centre of the car.

3. To facilitate the interchange of passenger cars fitted with continuous steam heating equipment it is proposed to adopt a uniform fitting on the ends of the train pipe. It is to consist of a 2-in. female pipe fitting with a standard pipe thread. Votes must reach Secretary Cloud at Chicago by Oct. 7.

The Butler Malleable Iron Drawbar Attachment.

The latest form of the Butler drawbar attachment is shown herewith. This device has been in successful service for some time past and several railroad companies have ordered it made of malleable iron, and it is for such material that the design herewith has been brought out. It will be noticed that the parts are lighter and made of a thickness which will give nearly a maximum strength in malleable iron. The location of this attachment between the draw timbers and the method of holding the



PROPOSED METHOD OF FASTENING SAFETY CHAINS TO PASSENGER CARS.

same are clearly shown, and the shape of each part is indicated by the detail illustrations.

The office of the Butler Drawbar Attachment Co is in the Phenix Building, Chicago.

Net Section in Riveted Work.

BY THEODORE COOPER.

While experiments upon the strength of the connections and of individual members of pin-connected bridges have been quite extensive, very few experiments have been made upon the similar parts of riveted bridges. Our specifications and practice have all been in the direction of making the connections and minor details of pin-connected work superabundant in strength. In riveted work we are still dependent upon theoretical deductions based upon the net section of metal remaining after deducting the rivet holes and supposing this remaining metal to be fully equal to a prismatic bar of the same area. The method of estimating the net section is too frequently, judging by practical examples within our everyday experience, based upon false ideas as to the action of our materials when irregularly punched full of holes. To cut an imaginary transverse section at right angles to the axis of the riveted bar or plate, and deduct only the holes thus cut as the measure of the loss of section, is simple but very erroneous. The effect of a neighboring hole not on this imaginary line, but near thereto, should be considered. Let us consider from such evidence as we have what such effect would be.

Prof. Kennedy in his "Abstract of Results of Experiments on Riveted Joints," as made by the Research Committee of the Institution of Mechanical Engineers, says: "It has been found that the net metal measured zigzag should be from 30 to 35 per cent. in excess of that measured straight across in order to ensure a straight fracture. This corresponds to a diagonal pitch of $\frac{3}{8}\,p + \frac{d}{3}$ if p = the straight pitch and d the diameter of the rivet hole."

In order therefore to be sure that the line $x\,x$ (fig. 1) will be the proper measure, after omitting the holes a and b, of the strength of the bar, the neighboring hole c must be so placed that the diagonal lines $a\,c$ and $c\,b$ must measure together $\frac{4}{3}p + \frac{2d}{3}$ or if placed symmetrically to the holes a and b so that $a\,c = b\,c = \frac{2}{3}p + \frac{d}{3}$

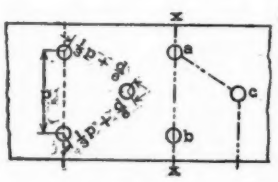


Fig. 1.

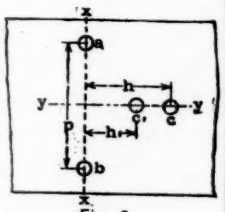


Fig. 2.

If the hole c is nearer than this, an additional allowance must be made.

Applying the same rule, let us determine at what point c must be in order to require the deduction of an additional hole, or three in all. This will be where the diagonal line has the same relation to $(p-d)$ as $\frac{1}{6}\,p + \frac{d}{6}$ is to p, or $\frac{1}{6}\,(p-d) + \frac{d}{6} = \frac{2}{3}p - \frac{1}{3}\,d$.

We need not deduct the hole c when the diagonal pitch is $\frac{2}{3}\,p + \frac{d}{3}$; but must deduct a full hole when the diagonal pitch becomes $\frac{2}{3}\,p - \frac{1}{3}\,d$.

It will simplify the results if we put the pitch p in terms of d, or call

$$p = n\,d.$$

The above values for the diagonal pitch then become respectively

$$\frac{(2n+1)\,d}{3} \text{ and } \frac{(2n-1)\,d}{3}.$$

As the usual method in ordinary riveted joints is to lay off the pitch of staggered riveting on right-angled lines, it will be well to transfer the above values into the proper values as thus measured. Let c (fig. 2) be the proper position of the hole and c_1, the position where an additional hole must be deducted, and call their horizontal pitch as measured from a and b respectively h and h_1.

Solving the triangles, we obtain the following values for h and h_1 for different values of $p = n\,d$.

Pitch $n\,d=$	Proper position of c $h=$	Position c, where a full hole is to be deducted $h_1=$
3 d	1¾ d	¾ d
3.5 "	2 "	1 "
4. "	2¼ "	1¼ "
4.5 "	2½ "	1½ "
5. "	2¾ "	1¾ "
5.5 "	3⅛ "	1⅞ "
6. "	3½ "	2⅛ "

Inspection of the second column would give as a sufficient approximate rule for the proper horizontal pitch in staggered riveting *one-half of the vertical pitch plus one-quarter diameter of a rivet hole.*

Comparison of columns 2 and 3 shows that a pitch *one diameter* less than the above rule would necessitate the deduction of a full rivet hole additional.

By plotting different joints with the above dimensions, the small variations in the portions of the holes giving good and bad results will be readily appreciated.

When it is appreciated that holes staggered according to the pitch in the third column cut away as much metal as the same number of rivets arranged chain-riveted style within a smaller area, designers will either adopt the chain riveting or else space their rivets in accordance to the rule formulated above.

The Interstate Commerce Commission's Statistical Report.

Prof. Henry C. Adams, statistician to the Interstate Commerce Commission, has issued advance sheets of his report for the year ending June 30, 1889. The tables are not included, but the introduction presents the totals of a number of these tables, which are of general interest.

The railroad mileage of the United States on June 30, 1889, was 157,758.83 miles. Of this 149,948.66 miles are covered by reports to the Commission. The total amount of all tracks, first, second, third and fourth, was about 200,950 miles. The mileage of road, June 30, 1888, was 149,902 miles. The present report includes 117 private roads, with 1,008 miles, that did not appear the year before, so that the length of new line brought into operation during the year ending June 30, 1889, was 6,848.70 miles. Included in this mileage reported, the number of bridges is found to be 40,600, of which 17,042 are constructed of wood, 8,185 of stone, 11,838 of iron, and 3,535 being a combination of wood and iron. Tunnels to the number of 649, with an aggregate length of 608,012 ft., have been reported, and trestles to the number of 117,271, with an aggregate length of 26,615,877 ft. The 5-ft. gauge, which in 1880 was used by 91 roads and represented 11.4 per cent. of total mileage, has nearly disappeared. The gauges 4 ft. 8½ in. to 4 ft. 9 in., inclusive, which in 1880 were adopted by 874 roads, representing 79.8 per cent. of total mileage, are now used by 1,371 roads, representing 93.3 per cent. of total mileage. The 3-ft. gauge in 1880 was used by 144 companies; in 1889 this gauge was used by 231 companies, representing 6 per cent. of the total mileage of the country. At the present time over 99 per cent. of mileage in the United States may, for all practical purposes, be included in two gauges.

Summary of Equipment.

Class of equipment.	Number.	Number fitted with automatic coupler.	Number fitted with automatic train br'k.
Locomotives:			
Passenger	8,079	178	7,706
Freight	15,140	44	8,743
Switching	4,016	.....	1,366
Unclassified	1,801	.....	180
Total	29,036	222	17,995
Cars:			
Passenger service	25,635	23,348	23,540
Freight service	854,031	46,644	66,513
Company's service	31,657	440	1,965
Fast freight line service	49,766	1,867	1,457
Total	961,119	72,299	93,475
Less cars leased	26,873	.....	16,043
Total owned	934,246	72,299	77,432
Cars leased	134,309	7,989	32,732
Total equipment	1,097,591	80,510	128,159

Averages.

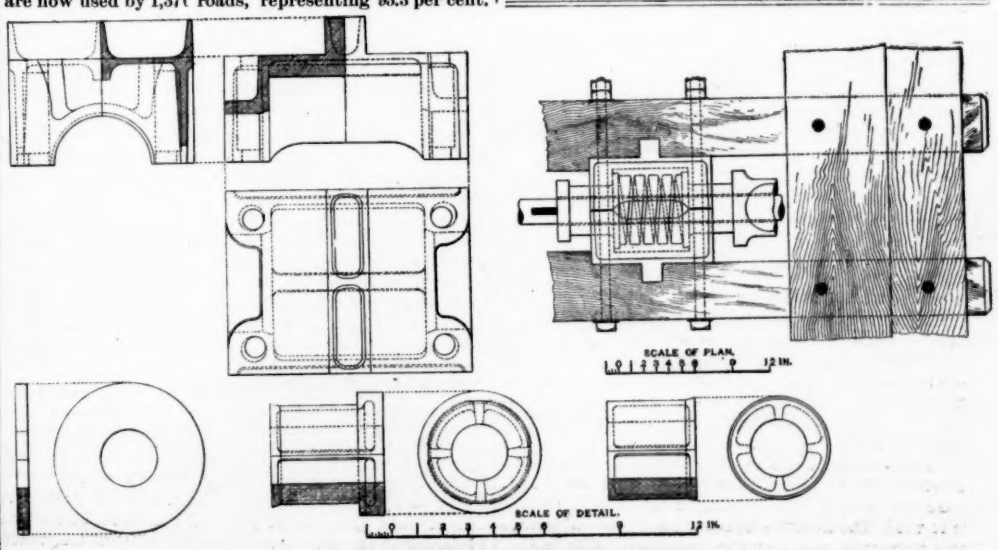
Engines per 100 miles of line (Freight 10, Pass. 5)	19
Cars, freight, per 100 miles of line	557
Cars in passenger service per 100 miles of line	17
Tons carried per freight engine	35,643
Ton miles per freight engine	4,538,786
Passengers carried per passenger engine	58,444
Passenger miles per passenger engine	1,430,105
Freight cars per 1,000,000 tons of freight carried	1,583
Passenger cars per 1,000,000 passengers carried	54

Of the 80,510 cars equipped with automatic couplers, 22,566 had the M. C. B. type, and 17,536 of these were Janney. There are 8 other M. C. B. type couplers in the list and 39 kinds altogether, including Miller 18,941, Cowell 61, Ames 11,808 and Blackstone 149.

Out of 704,743 employés, there were to each 100 miles of road 38 stationmen, 36 trainmen, 95 trackmen, 21 switch and flagmen, 49 shopmen, 20 enginemen and 14 conductors. Comparisons are made per 100 miles with employés on English railroads.

Table Showing Efficiency of Employés.

Class of employés in which the service of one man is necessary to effect the quantity of traffic stated.	Tons of freight carried	Thousands of ton miles	Passengers carried.	Thousands of passenger miles
Enginemen	17,859	2,274	15,626	382
Firemen	16,867	2,148	14,758	361
Conductors	25,755	3,281	22,535	551
Other trainmen	9,783	1,246	8,560	209
Switchmen, flagmen and watchmen	16,331	2,080	14,289	350
Telegraph operators and dispatchers	31,862	4,058	27,878	



THE BUTLER DRAWBAR ATTACHMENT.

The property, the operations of which are covered in this report, is administered by 436 organizations that are independent of each other, so far at least as corporate relationships are concerned.

A summary of the supplement shows that 87 roads, whose names appeared in last year's report, fail to appear in the list of roads for the year ending June 30, 1889. Of this number, 26 disappeared by consolidation, 39 by merger, and 22 by re-organization. Of the 732 subsidiary roads, an abstract of whose contracts is on file in this office, 162 are operated at a fixed rental, 211 are operated at a contingent rental, 163 are operated on condition that fixed charges, either entire or in part, are met by the lessee company, and 196 are operated as proprietary companies.

Summary of Capital (153,385.37 *Miles of Line Represented*).

	Amount outstanding.	Per cent. of total capital.	Per mile of road.
Stocks			$27,716
Common	$3,677,266,136	40.78	
Preferred	573,924,583	6.37	
Funded debt			28,176
Bonds	4,267,527,859	47.54	
Car trust obligations and receivers' certificates	54,328,164	.60	
Current liabilities			2,883
Audited vouchers, bills payable, etc	250,282,196	2 78	
Dividends, interest and miscellaneous	191,846,436	2.13	
Total	9,015,175,374	100.	58,775

Table Showing Railroad Ownership of Stocks and Bonds in Millions of Dollars.

	Outstanding, June 30, 1889.	Owned by railway corporations.	Not owned by railway corporations.
Stocks	4,251,191	847,740	3,403,450
Bonds	4,267,528	304.233	3,963,295
Total	8,518,719	1,151,973	7,366,745

Of the stocks 61.67 per cent. and of bonds 18.19 per cent. received no returns during the year; 25 per cent. of the bonds got 5 to 6 per cent. interest, 20 per cent. got 6 to 7 per cent., and 14 per cent. got 4 to 5 per cent. Nine per cent. of the stocks got 5 to 6 per cent. dividends, 7 per cent. got 4 to 5 per cent., while 8 per cent. received 6 to 8 per cent.

The number of passengers carried by the railways of the United States during the year ending June 30, 1889, was 472,171,343; the aggregate number of miles traveled was 11,553,820,445, an average journey of 24.47 miles for each passenger. Passenger train mileage for the same period was 277,240,804, and the average number of passengers in a train was 42.

The number of tons of freight carried during the year ending June 30, 1889, was 539,639,583; the aggregate number of ton miles was 68,727,223,146, an average haul of 127.36 miles. The freight train mileage was 383,200,573, and the average train load was 179.35 tons.

Summary of Earnings and Income (153,385.37 *Miles of Line Represented.*)

Source of income.	Gross amount.	Proportion to total earnings from operati'n Per cent.	Proportion to total income. Per cent.
Passenger service	$300,063,891	31.10	27.53
Freight service	644,777,801	66.82	59.15
Other earnings from operation	19,576,653	2.04	1.80
Earn. not classified	397,784	.04	.04
Total earn. from operation	$964,816,129	100	....
Income from other sources	125,169,702	....	11.48
Total earn. and income	$1,089,985,831	....	100

Summary of Expenditures (153,385.37 *Miles of Line Represented*).

		Proportion to total operating expenses.		Proportion to total expenditures.	
		1889.	1888.	1889.	1888.
Maintenance of way and structures	$144,821,953	Per ct. 22.46	Per ct. 22.60	Per ct. 15.54	Per ct. 15.27
Maintenance of equipment	106,709,258	16.55	17.09	11.45	11.55
Conducting transportation	330,515,439	51.33	50.26	35.49	33.96
General expenses	60,820,469	9.44	9.24	6.52	6.32
Not classified	1,439,582	.22	.71	.15	.48
Total operating expenses	644,706,701	100.	100.	....	....
Fixed charges	287,624,410	....	....	30.85	32.42
Total expenditures	932,331,111	....	....	100.	100.
Fixed charges of subsidiary roads	56,265,984	....	....	....	....
Total expenditures, all roads	988,597,095	....	....	....	....

Income Account.

		Per mile of line.
Gross earnings from operation	$964,816,129	$6,290
Less operating expenses	644,706,701	4,203
Income from operation	320,109,428	2,087
Interest on bonds owned	9,478,596	62
Dividends on stocks owned	10,406,153	68
Rentals of tracks, yards and terminals	79,490,863	518
Miscellaneous income, less expenses	25,794,090	168
Income from other sources	125,169,702	816
Total income	445,279,130	2,903
Deductions from income:		
Interest on funded debt accrued	213,173,672	1,389
Interest on interest-bearing current liabilities accrued, not otherwise provided for	6,795,937	44
Rentals, including tracks, yards and terminals	96,330,391	628
Taxes	27,590,394	179
Total deductions from income	343,890,394	2,242
Final net income	101,388,736	661
Dividends, 1.91 per cent., common stock	70,025,180	.....
Dividends, 2.11 per cent., preferred stock	12,085,018	.....
Total	82,110,198	535
Surplus from operations of year ending June 30, 1889	19,278,538	126

Comparative Summary.

	1889.	1888.
Revenue per passenger per mile...cents	2.165	2.349
Cost per passenger per mile	1.993	2.042
Revenue per ton per mile	0.922	1.001
Cost per ton per mile	0.593	0.630
Revenue per passenger-train mile	$1.06.287	$1.13.952
Cost per passenger-train mile...cents	83.068	84.691
Revenue per freight-train mile	$1.65.377	$1.65.712
Cost per freight-train mile	$1.06.481	$1.03.876
Revenue per train-mile, all trains	$1.39.191	$1.46.719
Average cost per train-mile, all trains, cts.	94.868	96.050
Percentage of operating expenses to operating income	66.81	65.34

Summary of Financial Operations of Operating Roads for the year ending June 30, 1889 (146,586.16 *Miles of Line Represented*).

	Amount.	Proportion to total.
Resources to be accounted for:		
Net income from operation	$299,926,121	37.90
Income from bonds, stocks and other property owned	44,177,911	5.58
Increase of permanent liabilities	255,.50,988	32.24
Increase of current liabilities	55,826,411	7.06
Decrease of current assets	57,253,995	7.24
Miscellaneous income	78,955,841	9.98
Total including miscellaneous income	791,291,267	100.
Resources accounted for:		
Assigned for payment of fixed charges	270,408,462	34.17
Reduction of permanent liabilities	12,636,853	1.60
Decrease of current liabilities	49,270,804	6.23
Increase of current assets	74,119,725	9 36
Net betterments to property	180,602,142	22.82
Miscellaneous expenditures	150,590,429	19.03
Assigned for payment of declared dividends	53,662,852	6.79
Total	791,291,267	100.

The following is a list of facilities as reported by the roads in response to the question, "What station-houses, stock yards, or other terminal facilities does this road use for which it pays a rental?"

Station houses	321
Stock yards	19
Other terminal facilities	172

A list of 56 private car companies is given upon whose cars one prominent road paid mileage during the year. In this connection the report says:

There is at least one very important consideration in favor of making the investigation into railroad matters undertaken by the Commission comprehensive and complete. There is an impression in the mind of the public that part of the legitimate earnings of railway capital is turned aside from the payment of dividends and applied to the support of various outside corporations. In this manner, it is argued, not only is the demand of the public for cheap service estopped by the quotation of false statistics pertaining to the earnings of railways, but the bona fide investor in railway stocks is obliged to take less in dividends than the earnings of the business warrant. This claim is either true or it is not true; but it is to the interest of the stockholder, as well as to that of the public, that the veil of secrecy be taken from the operations of all secondary corporations engaged in a business directly bearing on the transportation of persons and freight.

Wooden Trestle Bridges.*

BY WOLCOTT C. FOSTER.

STANDARD FRAMED TRESTLE, SAN FRANCISCO & NORTH PACIFIC RAILROAD.

The accompanying illustrations represent the standard plans of the San Francisco & North Pacific Railroad for framed trestles. Mr. Frank K. Zook is the Chief Engineer of this road.

This trestle belongs to the same class that we have been discussing lately, *i. e.*, multiple story continuous post trestles. It does not, however, belong to the compound member trestles, as all of its members consist of but a single piece, instead of being built up from two or more smaller pieces. While the floor system has some good features, still it could very easily be greatly improved.

The guard rails are of a good size, 6 in. × 8 in., and are well notched down over the ties. They are also well bolted, being held in place by eight ⅝-in. bolts extending through the ties and outside stringer pieces. The ties, while of good section, 8 in. × 8 in., would be better if they were 12 ft. long instead of 10 ft., with the ends supported by jack stringers. It would also improve matters to place the ties nearer together. They should not be spaced over 6 in. between faces, while in this trestle they are about 11 in. apart. The ties are notched over the stringers 1 in., which practice is to be recommended, as it adds greatly to the stiffness of the structure.

Each track stringer is composed of three 7-in. × 16-in. × 31-ft. 5¼-in. pieces of timber bolted together by four ⅝-in. bolts, but separated 6 in. by cast-iron spools or thimbles. The joints of the different pieces composing each stringer are broken; the ends, however, do not abut, being separated ¾ in. This construction is unique, to say the least, for trestle building. The packing bolts, however, are not spaced in such a manner as to give the joint the greatest strength, and it would be much better were they ¾ in. in diameter instead of ⅝ in. An intermediate packing bolt is placed through the stringers over the centre of each bay. The stringers are notched over the caps 1 in.

The floor system as a whole is held in place by ¾-in. bolts passing up through the cap across the outside face of the centre piece of each stringer and through the tie immediately over the cap.

The cap, which is of very good dimensions, is fastened to the posts by drift bolts. It is also notched over each post.

The posts are of 12-in. × 12-in. timber, the two inner ones being vertical, while the outer ones have a batter of 3 in. to 1 ft.

In the upper story the diagonal sway bracing is 4-in. × 8-in. It is attached at the ends by a ⅝-in. × 17½-in. bolt and two spikes. At each intermediate intersection the bolts are omitted, but there are three spikes instead of two. In the second story this bracing is of 4-in. × 10-in. material, while in the third or lower story it is 4-in. × 12-in. The horizontal sway bracing consists of 4-in. × 8-in. sticks throughout all of the structure.

The posts are notched into the main sill, which is of 12-in. × 12-in. timber.

The structure is stiffened longitudinally by horizontal braces of 6-in. × 8-in. timber placed on the outside of all four posts at each story. These braces are bolted to the posts by ⅝-in. × 18½-in. bolts.

When a pile foundation is used one pile is driven beneath the foot of each post, but when it becomes necessary to use a sub-sill foundation then four blocks 6 in. × 12 in. × 3 ft. are placed beneath the foot of each post.

The bents are spaced 15 ft. 9 in. between centres, except the end bents, which are but 15 ft. 6 in.

Following is given a bill of timber and a bill of iron for one bent and one bay:

BILL OF TIMBER FOR ONE BENT AND ONE BAY.

Name.	No. pieces.	Size.	Ft. B. M.
Floor System:			
Guard rails	2	6 in. × 8 in. × 15 ft. 9 in.	126
Ties	10	8 in. × 8 in. × 16 ft.	534
Stringers	6	7 in. × 16 in. × 31 ft. 5¼ in.	1,761
First Story:			
Cap	1	12 in. × 12 in. × 14 ft.	168
Posts (see end).			
Sway braces (diagonal)	2	4 in. × 8 in. × 20 ft.	107
Sway braces (horizontal)	2	4 in. × 8 in. × 19 ft.	102
Second Story:			
Sway braces (diagonal)	2	4 in. × 10 in. × 23 ft.	154
Sway braces (horizontal)	2	4 in. × 8 in. × 25 ft.	134
Third Story:			
Sway braces (diagonal)	2	4 in. × 12 in. × 30 ft.	240
Sill	1	12 in. × 12 in. × 32 ft.	384
Posts:			
Plumb	2	12 in. × 12 in. × 35 ft. 9 in.	858
Batter	2	12 in. × 12 in. × 37 ft. 1 in.	890
Longitudinal Bracing:			
Horizontal	8	6 in. × 8 in. × ?	4 ft. per ft. per stick
Foundation:			
Piles (4) or sub-sills	16	6 in. × 12 in. × 3 ft.	288
Bank Bent:			
Add sheeting	?	3 in. × 12 in. × 14 ft.	42

BILL OF IRON FOR ONE BENT AND ONE BAY.

No. pieces.	Name.	Size.	Use.
2	Bolts	¾ in. × 37 in.	Floor system to cap.
10	Bolts	⅝ in. × 36 in	Packing bolts in stringers.
8	Bolts	⅝ in. × 28½ in.	Guard rails to ties and stringers.
4	Bolts	⅝ in. × 21½ in.	Horizontal sway braces to posts.
16	Bolts	⅝ in. × 18½ in.	Longitudinal braces to posts.
12	Bolts	⅝ in. × 17½ in.	Diagonal sway braces to posts etc.
20	Spools	6 in.	Separators for stringers.
106	Washers	For ⅝-in. bolts.	
4	Washers	For ¾-in. bolts.	
4	Drift bolts	Unknown.	Cap to posts.
66	Spikes	8 in.	Sway braces to posts, etc.
			Posts to sill.
	Drift bolts		Sill to piles.

Railroad Projects in Brazil.

Mr. Courtenay de Kalb, M. E., has an article illustrated by a map of Brazil in the *India Rubber World* of Aug. 15, proposing certain railroads in Brazil. The one of most interest to Americans is from Paramaribo, in Dutch Guiana, up the Surinam, and in a southwest direction from the head of that stream to Manaos, on the Rio Negro, which is just above its confluence with the Amazon. Manaos, which is the virtual head of ship navigation on the Amazon, is disputing with Para for the position of the primary shipping port for india-rubber. About 60 per cent. of the rubber of the Amazon Valley is now shipped direct to this country.

Another line spoken of would be in continuation of the

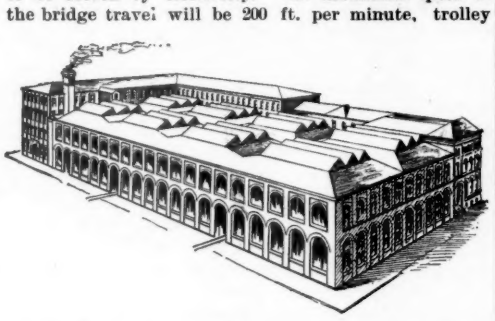
Dom Pedro Segundo railroad from Rio de Janeiro, running in a direction slightly north of west to Matto-Groso, on the Madeira, at the head of steamboat navigation. This line would pass by the heads of navigation of the streams draining all of the great river basins of Brazil, except the Sao Francisco and Purus; it would also join the navigable waters of the Parana and Paragua to Rio Janeiro.

The first mentioned line, excepting as it crossed the mountains dividing Guiana from Brazil, would pass through an easy country in which there is a good deal of gold, while the first, or eastern, portion of the extension of the Dom Pedro Segundo would be through broken country, but after leaving Goyaz would pass over the plains of Matto-Groso, where the country is very favorable; the eastern end is richly stored with minerals. Mr. de Kalb recommends a combined railroad building and colonization scheme.

New Erecting Shop—Baldwin Locomotive Works.

Work has been begun on an extension of the erecting shop of the Baldwin Locomotive Works, Philadelphia, which, when completed, will give greatly improved facilities for the work of erecting and do much to relieve the pressure for space in other shops. About the middle of July title was secured to 76 small properties in addition to nine previously acquired. These houses cover a space about 230 × 208 ft., or somewhat more than an acre, adjoining the present office and erecting shop buildings. The new buildings are shown by the view herewith.

The present office building, corner Broad and Spring Garden streets, is extended westward 47 ft. 9 in. This addition will give a drawing room and office each 169 ft. long by 32 ft. 6 ins. wide. The present office will be rearranged and a passenger elevator added. The present erecting shop will be replaced by the new building, which will be 336½ ft. long by 158½ ft. wide, one story of 42 ft. clear height to base of rafters. The floor of this shop will be occupied by tracks to accommodate 64 locomotives, there being 16 tracks, holding 4 engines each. At the height of 28 ft. will be placed two traveling cranes now building by Wm. Sellers & Co., which in some respects will be unlike any others yet built. They are each to be of 100 tons capacity, with a span of 74 ft. 8 in., and 336 ft. run, and are to be driven by electricity. The maximum speed of the bridge travel will be 200 ft. per minute, trolley



travel 50 and 100 ft., and the main hoist speeds 5, 10, 20 and 40 ft. per minute. It is the intention to handle and transfer from one track to another the heaviest locomotives complete by means of these cranes, lifting them high enough to clear others remaining on the floor, while for handling parts and lighter loads there is an auxiliary hoist capable of lifting 1,000 lbs. at a speed of 100 ft. per minute. The new building will also be fitted with four swinging cranes, one of 20 ft. and three of 17 ft. 6 in. swing, also with two freight elevators of large capacity, each 6 × 12 ft.

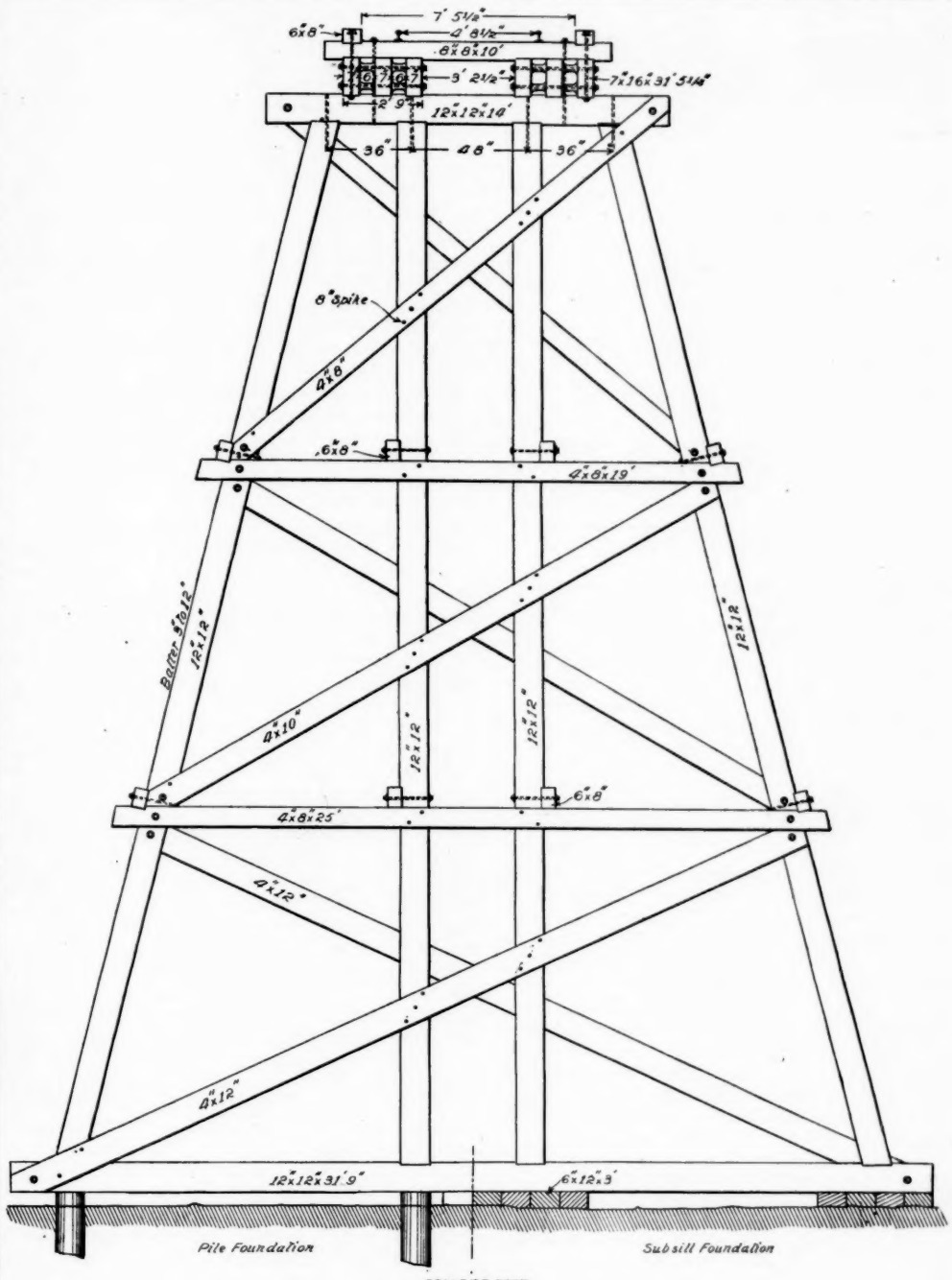
The perspective view herewith shows a row of large windows beneath the cranes and a row of smaller ones above them, also the method of lighting the floor by 24 large skylights in the roof. The shops will be exceptionally well lighted and ventilated, and every facility will be given for careful work, with the greatest comfort to the workmen, this being the primary object of the improvement.

Adjoining the erecting shop and facing on Fifteenth and Spring Garden streets will be an L-shape building, four stories high, and with a frontage respectively of 208 and 228 ft. on the two streets. That part on Fifteenth street will be 60 ft. wide and that part on Spring Garden street 50 ft. wide. The first floor will contain the machinery for boring and finishing cylinders, the second and third floors will be used for storing finished locomotive parts and for light sheet iron work, such as jacketing for boilers, and the fourth floor will be used for finishing and painting cabs. While the capacity of the works will be somewhat increased, the principal advantages sought by these improvements are sufficient space to do the work comfortably and carefully, without the necessity of hastening shipment to avoid blocking the shops.

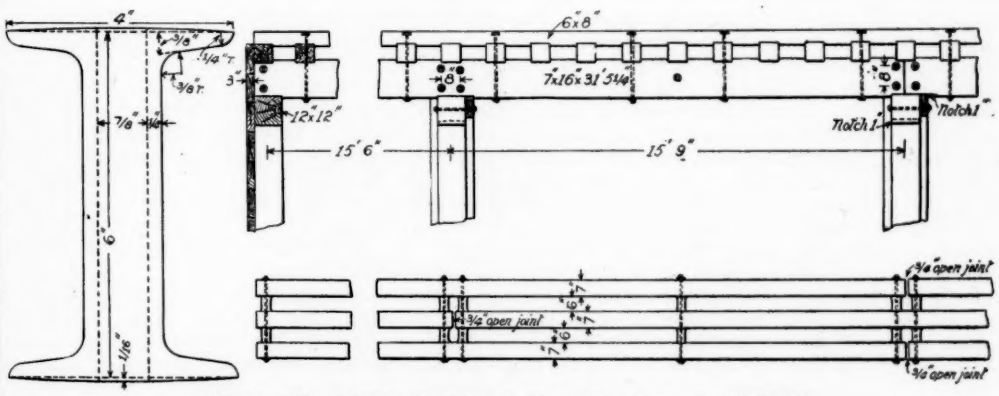
The Lake Erie and Ohio Ship Canal.

An article in the *American Manufacturer* says that at the last meeting of the commission Col. T. P. Roberts reported that the route of the proposed ship canal compared with the Welland Canal as follows: The Welland Canal is 26 miles long, with a lift between Lakes Ontario and Erie of 326 ft., which is overcome by 25 locks. The canal is 150 ft. wide and 14 ft. deep, passing vessels of 1,600 tons. The proposed canal would be about 100 miles long, viz.: 70 miles rising from the Ohio along the Beaver River, 15 miles of level at the summit and 15 miles in which to make the descent of 320 ft. to Lake Erie, as against a distance of about 10 miles on the Welland Canal for practically the same descent. This would call for between 13 and 16 locks of the most convenient lift, and would allow pools of probably three-quarters of a mile in length.

The work on this canal will not, it is claimed, be as heavy as on the Welland, though it will be nearly four times as long. No estimate of the cost has yet been given to the public, in fact the preliminary field work is barely completed, but there seems to be a growing conviction of the practicability of the route, which would be of great advantage to the valley of the Ohio and the Lakes. Colonel Poe estimated the freight charges on the 7,516,022 tons passing through the Sault Ste. Marie Canal at 1¼ miles per ton mile, and that the saving over carriage by railroads was $17,000,000 It is not, however, probable that such an amount of freight would, for several years at least, pass over the Lake Erie and Ohio Canal, and it is impossible that with the number of locks necessary there should be any such saving as compared with railroad transportation. It would, however, stand in the relation of a valuable feeder to the traffic on the lakes, and either during high water in the Ohio, or with specially constructed vessels, might afford a through route of some value between river points and ports on the lakes.



STANDARD FRAMED TRESTLE—SAN FRANCISCO & NORTH PACIFIC RAILROAD.



DETAILS OF FLOOR SYSTEM—S. F. & N. P. R. R. TRESTLE.

A New Iron Plant at Chicago.

The Chicago & Calumet Dock Co. has sold a block, with a west frontage on the Calumet River, between Ninety-fifth street, and the Baltimore & Ohio Railroad track, to S. Frank Engle, of Youngstown, O., and others, who propose erecting a system of blast furnaces rivaling that of the Illinois Steel Co. The portion of the plant to be completed this season covers one furnace with necessary stoves, engine and casting house, the last to be 165 × 64 ft. Between 100 and 200 men will be at work within a few days. The site, within half a mile of Calumet harbor, is a very desirable one for smelting Lake Superior ores. It is asserted, and denied, that Mr. E. C. Potter, lately Vice-President of the Illinois Steel Co., is interested in the new company.

RAILROAD GAZETTE

Published Every Friday,
At 73 Broadway, New York.

EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions. machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

The Quincy train accident, reported on another page, was of the most shocking description. The mere statement that most of the deaths were by scalding will explain to railroad men more than we can tell them by multiplying words. The wreck itself was no worse than others that we record by the dozen, almost, every month, but generally there are far less than seventy persons in a car, and the number of casualties is correspondingly smaller. The cause in this case seems to lie in negligence of a kind that can be profitably discussed only in the light of all the facts. Happily, the accident was in a State which thoroughly investigates and intelligently publishes the circumstances of such cases.

On another page is described the method of floating into position the great span of the Ohio Connecting bridge. A span of 523 ft., weighing nearly 1,000 tons, was erected along shore and then floated out and placed on its piers 75 ft. above the water level. In itself this event was important. any engineers watched it with great interest for 10 hours, although as a mere spectacle it was rather tedious. But its importance is not yet generally appreciated; it probably establishes this as one of the regular methods of erecting bridges over navigable streams. Already the "rivermen" of the Ohio say that hereafter no stagings must be put up in the channel. Of course, in any given case the conditions must decide whether cantilevers are used, or falseworks are built in the stream, or the erecting is done along shore and the erected span floated to place. The relative risk and cost will be taken into consideration. We have briefly stated elsewhere the considerations which led the Keystone Bridge Company to adopt the plan of floating the span. The railroad company was willing to pay something to avoid obstructing the channel, and the increased cost of the plan adopted was a legitimate expenditure that will not be criticised. Just what this increased cost will be we do not know yet. Some criticism has been made of the risk taken. On careful consideration of the matter it is by no means certain that there was any increased risk. Erecting bridges in the Ohio River is hazardous at best. Within two years the staging of two great spans has been carried out by floods. That danger is entirely avoided by the plan adopted for the Ohio Connecting bridge. So also is the danger from coal barges running into the falseworks. The only risk comes in the few hours that the work is afloat, and that is the risk of losing control of the mass in a gale. It was great luck that the tornado which struck Wilkesbarre Tuesday afternoon did not strike Pittsburg, 300 miles away. But in bridge erecting no one provides against tornadoes, and barring a tornado the danger to floating work is but little. By keeping out lines enough the moving mass can be kept under control in any storm that would not be dangerous to a span on fixed staging. Altogether, we should say that on a stream like the Ohio the sum of the dangers would be less in floating a span than in erecting it on fixed falseworks.

In looking over the interlocking plan presented in another column, we regret to see some innovations on practice which has become well established, and which there is no good reason for changing. For a long time one of the most discouraging facts observable in American railroad practice has been the tendency of every road to make its practice as different as it possibly could from that of all other roads. Each new officer has apparently deemed it incumbent upon him to exhibit originality of mind in devising signals and other mechanical devices, as well as in prescribing methods of operation and management. Within a few years there have been hopeful indications of a betterment of this state of things in some directions, and the influence of signal manufacturers, who, making apparatus for roads all over the country, have had an opportunity to spread their own ideas, has been looked to as an important factor in this improvement. It is natural to attribute an act of this kind to the fact that the signal company is a comparatively new one, but it is to be remembered that older concerns are not free from the same criticism. It is equally to be regretted, however, whether an old company or a new one gives countenance to changes which are sure to ultimately prove undesirable. But the exigencies of business have been difficult enough, even with the older companies; with a new one the obstacles to ideal signaling are apparently no smaller. In the East Boston plant the upper semaphore, where there are several on a post, is made to indicate the *left*-hand track, whereas the great majority of roads, and all, so far as we know, have adopted the opposite usage, making the upper arm indicate for the *right*-hand track. Certain other signals, which are undoubtedly home signals in their nature and office, even if by an arbitrary use of terms they are made to appear otherwise, are located beyond the fouling point; that is, they are so placed that an engineer must stop before he reaches them in order not to interfere with the conflicting routes. Of two tracks side by side, converging to a point, one has a starting signal and the other has not. We presume that in the actual operation of trains, as they are handled at this place, no trouble will ensue from this incompleteness, but it nevertheless tends to the subversion of the highest discipline, because it weakens the engineers' respect for signals generally. Doubtless, the Boston, Revere Beach & Lynn, like many a road of more ambitious proportions, is obliged to cut its coat according to the cloth, and we are not disposed to severely criticise either the road, which we presume has the physical limit of an insufficient yard, besides other difficulties to contend with, or, as we have just intimated, the manufacturers, who must furnish what is demanded; but, nevertheless, they have not only set up some apparatus which some day will need to be changed, but have also inculcated some ideas in enginemen's heads which also will have to be changed; and the last-mentioned change is the harder one to make.

The United States Court decision setting aside the opinion of the Interstate Commerce Commission in the matter of one-way party rates, of which we give a full abstract in another column, only sets forth the simple justice of applying the wholesale principle to passenger traffic, on the same general principles that it is employed in freight traffic. As these arguments were fully presented in the *Railroad Gazette* of March 7, we will not repeat our opinion. The justice of this decision is so clearly based on common sense that it was hardly necessary for the learned judge to quote from a dozen English decisions, especially as the Interstate Commerce Commission itself had laid down the correct principles in earlier opinions. In the task of justifying the use of the word "commutation" the dictionaries, unfortunately, give us little assistance; but the primary meaning of the word, if it amounts to anything, warrants the widest latitude in the use of the term. The evidence of railroad officers that party rate tickets have not been abused, if correct as regards the whole country, as we have no reason to doubt, removes one of the main arguments upon which the Commission apparently relied for the opinion held by it. As regards what should be considered a reasonable minimum limit in applying the wholesale principle there is some room for difference of opinion. It is of interest to note that the Pennsylvania, which has announced the resumption of party rate tickets since the publication of this decision, now takes seven persons at the rate formerly limited to ten or more. This is the number specified in a bill recently presented in Congress. The Pennsylvania is really making a reduction to the public which will pinch its competitors a bit, and, in fact, one of them already threatens to give reduced rates to parties of five. As to the extent to which the wholesale principle may be carried in the other direction there is still more room for discussion. In the carriage of freight the Commission and the courts have held that a train load ought not to receive any lower rate than a car load, and although these decisions are somewhat arbitrary, they have been generally acquiesced in as being based on substantial justice. The cost per ton is not enough less, on a train load of a single large shipper's goods than on a train load shipped by a dozen small shippers, to warrant a reduction in price; especially as the small shippers' consignments may in practice be held until a train load accumulates. A shipment of 100 cars is little, if any, cheaper to handle than ten shipments of 10 cars each, because the latter can easily be put together. But in passenger traffic different lots are not so readily "bunched," and a full train is so much more economical than the average train that a large reduction from the ordinary fare is possible; and the wholesale rate here may manifestly go as far below the single car load as the latter does below the individual rate; farther, in fact. The very cheap excursions now so common furnish a familiar illustration of this.

The railroad men seem to think that the old party rates were exactly adapted to the condition of the theatrical managers' pockets; but at the time so many roads abandoned the special tickets we believe there was considerable congratulation among the more prosperous theatrical managers over the fact that impecunious concerns were to be driven out of the business. It would seem therefore that there may be two sides to the question whether or not histrionic art is really to be promoted by these philanthropic passenger agents who so carefully adjust rates to—develop traffic.

Lateral Motion Trucks, Their Vertical Movements and Lateral Resistances.

The swing-motion truck is being generally discussed at the present time, and last winter at the Western Railroad Club the question of a swing vs. rigid truck for freight cars excited as much interest as any topic during that season. At the recent Master Mechanics' meeting at Old Point Comfort the liveliest speeches were upon the question of moguls and 10-wheelers bringing in the matter of lateral motion trucks. Several of the locomotive builders have recently changed their method of hanging swinging trucks, but not all have changed in the same direction, and the statement is made that it matters but little how the links for such trucks are arranged, whether vertically or inclined inward or outward. Some time since we promised to present to our readers an analysis of the different methods of hanging swinging truck centres to give them different degrees of freedom of lateral motion, and we present herewith such an analysis, covering all the common varieties of trucks.

The types of trucks considered are: Swinging links, parallel and vertical; swinging links, spread at the bottom, or diverging; swinging links drawn in at the bottom, or converging; swinging links with double bearing at the top, such as are used on the Pennsylvania consolidations (shown in the *Railroad Gazette* Jan. 26, 1877, and in "Recent Locomotives," edition of 1886, figs. 66 to 69), rollers working on inclined planes, radial axle box with lateral spring resistance, and parallel swinging links with lateral spring resistance.

The method of making this analysis avoids the use of mathematics, and is easily followed by any one familiar with geometry and mechanical drawing. But little labor is required to analyze any particular case to find the effect on the front of the engine produced by a given method of support.

No trouble is experienced with swinging trucks, radial or otherwise, when the track is reasonably straight; but upon sharp curves and short turnouts wheels will sometimes ride over the rails. The cause for this would seem to be not hard to find. Inquiry was made at the Master Mechanics' Convention to find if a case was on record where the radial truck of a mogul locomotive had left the rails at high speed or on a reasonably straight track. No one seemed to know of such a case, but several were aware of instances where the radial truck had left the rails on entering sidings at low speed. The swing-motion radial truck for mogul locomotives requires more care in design than any other truck used in railroad service. Aside from the question of the length of the radius bar, and other details, the device which provides a lateral motion needs very careful attention. Particularly is this true on crooked roads and on single track roads where locomotives are liable to run into sidings at considerable speed. If the lateral motion is not well provided for,

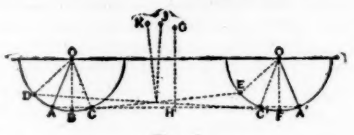


Fig. 4.

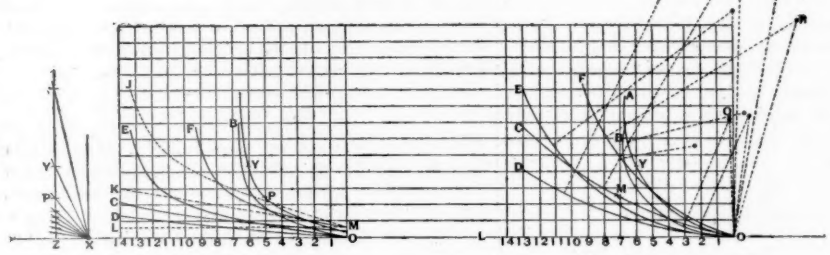


Fig. 3.

Fig. 2.

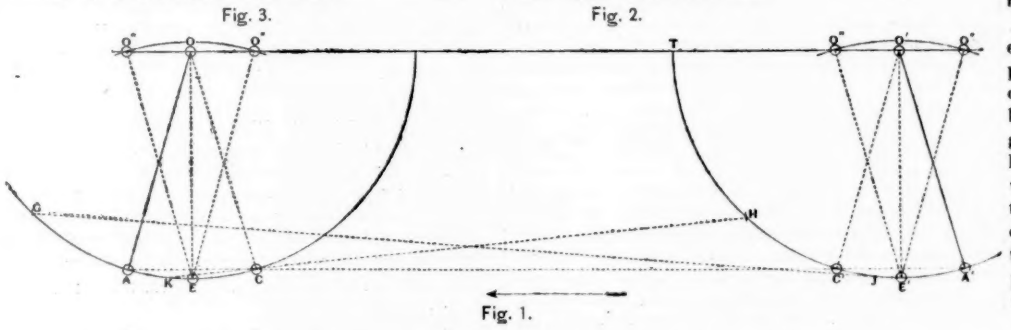


Fig. 1.

the danger of the truck wheels leaving the rail is very great. In some designs now in use it is next to impossible to enter a siding with abrupt approaches without the truck riding up on the rails or displacing them laterally.

The statement is made by two locomotive builders and by several railroad men that the position of the swing links matters but little; they may be parallel, or spread at the bottom or the top, the effect is the same. This is almost equivalent to saying that it is no matter how they are hung. But in the face of this there is a great difference in the results of the different designs to provide lateral motion, as we shall presently show; and the difference is so great that it is somewhat surprising that it has not made itself more apparent. It is to be regretted that something like a standard means for providing lateral motion has not been developed after the long years of experience which we have had in this country with the swing truck, and it is a matter well worth attention from the Master Mechanics' Association.

The centre bearings for swing trucks are generally made in one of three ways, namely, flat, ball or pivot bearings. The flat bearing is, of course, a ball bearing of infinite radius. The ball bearing, as commonly used, allows the centre pin to take a new position, as the angularity of the swing links changes the position of the lower centre. The pivot has a small bearing, and its centre always remains in the centre of the swinging centre and midway between the lower ends of the swing links. These points we will consider hereafter.

The various methods of support are illustrated in fig. 1. For instance, O and O' are the upper supports of the swing links, and A, E and C the lower ends of the same. With the bottom of the links spread outward, or diverging, the position of those links, when the truck is in the centre of the engine, are $O\,A$ and $O'\,A'$. When the links are parallel their positions are $O\,E$ and $O'\,E'$. When they are inclined inward at the bottom or converging, the positions are $O\,C$ and $O'\,C'$. When there are two upper bearings, as in the Pennsylvania type, the positions of the swing links—each link being equivalent to two—are $O''\,E$ and $O''\,E'$, and $O'''\,E$ and $O'''\,E'$. When the swing centre is moved in the direction of the arrow in the case of the Pennsylvania type, the links in use are $O''\,E$ and $O''\,E'$. The pivots O''' are only brought into use when the direction of motion is opposite to the arrow.

In the case of parallel links, as $O\,E$ and $O'\,E'$, it is evident that the centre bearing, the bottom of which is shown at the proper height at $O\,L\,O$, figs. 2 and 3, will move vertically into positions parallel with the initial position. In case the links are inclined outward or inward, the bearing face of $O\,L\,O$ will occupy various angles to its initial position. To illustrate this, draw the line $A\,A'$ passing through the lower centres of the link when in the initial position. This line is horizontal. Now, when the truck has moved to one side and the point A' corresponds with the joint J and the point A with the point G, the line $G\,J$ drawn between the centres is no longer horizontal, but is at an angle with the horizontal line. The bottom of the engine top centre pin, however, in the case of a flat bearing, remains horizontal, hence the faces of the top centre pin and the swing centre bearing do not coincide, and by reason of this angularity the engine is raised more than it would be if the lines drawn between the lower centres remained horizontal, as is the case with the parallel links or with the Pennsylvania type. If the centre bearing be flat the whole bearing of the centre pin, after a lateral movement, will be on the corner at O, and the total rise of the engine due to this lateral motion would be the sum of that due to the rise of the ends of the links and that due to the angularity of the centre pin faces.

If the centre pin is a pivot bearing, then the rise of the engine results simply from the rise of the centre of the pivot; if it is a spherical bearing, the angle of the radius of the sphere will be changed in the same amount as the angularity of the lines just described, and the rise will be intermediate between the rise with a flat centre and that with a pivot, depending of course upon the radius of the sphere. If the radius is a small one, then the rise will be nearer that of the pivot. If it is a large radius, then it will be closer to that of the flat bearing.

In the case of the Pennsylvania type the curve described by the lower ends of the swing links is not the same as that described by the lower ends of the links in the other types, as will be readily understood.

In each of these different cases the length and angularity of the swing links are kept the same for all designs, the object being to render possible a comparison of the effects of the different methods of hanging. It is true, however, in each case that a change in the angularity would produce a decided change in lateral resistance; but the point is to show that with the same general dimensions it does make a difference how the trucks are hung.

In order to find the rise of the engine for the different lateral displacements, the most convenient method is to construct a skeleton swing motion, with links of the proper length and with the point O attached thereto and fitted with a pencil, which will describe curves as the model is shifted in the same way that the engine truck would be. Some little trouble is required to construct such a model, but in the end it will pay, because the exact effect of various combinations of links and centres can be so readily determined. In lieu of this method the curves showing the rise of the engine can be constructed as follows:

The point O, fig. 2, represents the location of the right-hand corner of the centre pin in the normal position. As the centre is swung to the left in the direction of the arrow, at the bottom of fig. 1, the angularity of the centre pin bearing is such as to cause O to be the highest point, and therefore the one to be recorded, as it is the highest point which governs the rise of the engine. If the links be hung outside, then the left-hand point O, fig. 3, will be the highest point, for the reason that the angular inclination of the swing centre is opposite, in the case of the links spread at the bottom, to that when the links are drawn together at the bottom. By shifting the pivot centres of the model, however, the curve of rise for the left-hand corner of the centre pin can be drawn through the point O, fig. 2, and thus the various curves of rise may be shown all on one diagram, as indicated in fig. 2. Without a model, therefore, it is only necessary to record the motion of the point O by means of dividers set at the proper distance in the following manner: Suppose the inside link C, fig. 1, to move laterally in the direction of the arrow to the point K, the location of C' will then be found at H, on the arc $C'\,H$, at a distance from K, such that $K\,H$ equals $C\,C'$. Having now found the location of the lower centres, the movement of the point O can be determined by finding the intersection of two arcs, one with a radius $C'\,O$, described about H as a centre, and the other with a radius $C\,O$, described about K as a centre. The intersection in this case is at M, on the arc $O\,C$, fig. 2. In this manner every point of the different curves can be determined without the use of a model.

The object is always to determine the path of a governing point. In the case of a flat centre bearing, this point is the extreme edge of the centre pin. In the case of a pivot, it is the centre of the centre pin. If the bearing be of spherical form, then the location of the governing point will vary somewhat with the angularity of the swing centre in its different positions, and will lie somewhere between the edge and the centre of the top centre pin; that is, between O and 12, fig. 2, depending upon the radius of curvature of the centre—the smaller the radius the nearer to 12 the governing point will be, and the greater the radius the nearer it will be found to O.

As described in the foregoing, the curve $O\,A$, fig. 2, is made to represent the rise of the front end of the locomotive for different lateral displacements with a flat centre pin, and with the bottoms of the links diverging, as shown at A and A', fig. 1. In the same way $O\,B$ represents the rise in the front of the engine with the same location of swing links with a pivot bearing. In the same way, also, the curve lines $O\,C$ and $O\,D$ represent the rise of the engine when the swing links converge, as shown by the positions $O'\,C'$ and $O\,C$, fig. 1. The curve line $O\,C$, fig. 2, is with the flat centre, and $O\,D$ with a pivot centre.

Between $O\,A$ and $O\,B$, and also between $O\,C$ and $O\,D$ would lie the curved lines, if drawn, which would represent the rise of the engine with spherical centre bearings with varying radii. The curve line $O\,E$, fig. 2, shows the rise on the front of the engine when the swing links are parallel. In this case there is no second line, as it makes no difference whether the centre is a pivot, a spherical or a flat bearing; it always moves parallel to itself. This is true also of the Pennsylvania style of hanging, and the line $O\,F$ represents the rise of the engine when hung in that way. It will be noticed that this last method of supports is, in point of rise of the front of the engine, not unlike that when the links are drawn in at the bottom; but this is not to be taken as indicating that the results are the same in practice, because it may not be so; the results so largely depend upon the amount of the spread and the length of the links. This coincidence of rise only shows that with the same spread and length of links the result is as indicated.

Further discussion of this subject, together with an explanation of the remainder of the diagrams, will be given in a subsequent issue.

Joint Responsibility of Conductor and Engineer.

The railroad mileage of the United States has now become so large that a great variety of mishaps is reported every month. In the July accidents, summarized in another column, we have accounts of an engineer who defied a flagman, apparently taking the risk of a collision with his eyes wide open, and of a fireman whose enmity to his engineer caused him to beat the latter fatally with a hammer while train was running. A collision at Genesee Junction, N. Y., on the 15th, which, although near a crossing, appears not to have been a crossing collision, resulted from such an aggregation of causes that we find the jury censuring four individuals, besides the railroad company. Only the second of these causes is unusual; though in saying that foolhardy engineers who defy red flags are not unusual we do not mean that they cause many wrecks or that they constitute more than an infinitesimal fraction of the whole number of engineers in the country. But there are instances of another kind of recklessness shown in the July record, which is alarmingly common, and of which we wish to speak, and that is the failure of a conductor and engineer to check each other's errors or forgetfulness. At Smithville, Ind., on the 14th, a butting collision was caused by the stopping of a conductor's watch, and at Fostoria, O., on the 25th, the engineer of a train started from a side-track when he

had no right whatever to the road. At Smithville the engineer failed to check the conductor and at Fostoria the conductor failed to check the engineer.

Engineers are supposed to have watches and to consult them before infringing on another train's rights. The rules prescribe this very clearly, and an engineer has no more right to start ahead of time than if his train never had a conductor. The fact that the conductor failed to warn him is no excuse for him in case he makes a blunder of this sort. In the Smithville case the engineer, at some point in his journey, began to infringe upon the right of the opposing train; but, instead of recognizing this fact and promptly stopping his train, he depended wholly upon the conductor. At Fostoria the conductor apparently sat carelessly in the caboose and allowed the engineer to make a very costly blunder, though there is no report of extensive personal injury, as at Smithville. Quite likely he would have warned the engineer in a few minutes, but his duty was to stop him before he had gone a car's length. It may be said in this, as it has been said in other cases, that the engineer's disobedience of the rule forbidding a train to be started without a signal from the conductor (Rule 119, Standard Code) rendered the latter powerless; but even then the conductor must answer whether he has always reported such carelessness, when observed, to headquarters; and if he be like most conductors he can also ask himself if the habit of telling engineers some minutes beforehand that they may start "after so-and-so arrives" is not a dangerous infraction of the rule just referred to.

It is true that in cases of the sort we refer to both men are generally punished, and probably they in most cases receive equal penalties; but the trouble is in the lack of prevention. Rule 120 is all well enough as far as it goes, but it by no means covers the case.

The regular and correct performance of duty is very largely a matter of habit. The train rules prescribe a lot of habits to be followed by conductors and engineers, and, in addition, prescribe numerous duties on whose proper performance life and property are dependent, but which no human being can expect to invariably perform with certainty unless he himself form rigid habits in relation to them. The rules do not describe these habits in detail because it is believed in many cases to be impracticable. Whether it is or is not really impossible to make the rules more full and minute we will not now discuss, further than to repeat what we have said before, that brevity is oftener a defect than a merit in train rules as we find them. But whatever the shortcomings of the code, it is the duty of trainmen to form correct habits in the performance of every-day acts on which they know that lives and property depend, and of the officer in charge to see that the trainmen realize this and govern themselves accordingly. A railroad company has not done its whole duty when it punishes employés who have disobeyed a rule, any more than the community has done its whole duty when it kills a murderer. It is a good lesson to the culprit, as the Irishman said; but the more important need is something to correct the behavior of others, and experience teaches that trainmen will not learn all they should from the mistakes of their fellows unless they have assistance.

To run trains safely, conductors must form the habit of always giving a signal for the train to start, and must report engineers who break the rule. They must examine their watches frequently, and must compare them frequently with a brakeman's. They must ask themselves periodically whether they are making or losing time. This habit must be adjusted to the character of the line, number of stations, etc., and cannot be prescribed here for general use, but must be fixed for each case, and should be as rigid as the rules regulating speed. A conductor should have a regular place for keeping his telegraphic orders, and perhaps bind himself to give thought to the subject of orders at certain times and places other than telegraph offices. An engineer must have mental forms by which to question himself before acting on a conductor's order to move. It is even more necessary for him than for a through freight conductor to pursue a regular habit in the matter of train rights, because he is more liable to an interruption that will completely absorb him. We have mentioned only a few points, as space would obviously be insufficient for a full catalogue. *The trainmaster should see that all these necessary habits are learned and practiced.* Here is the weak point. The trainmaster has not time enough, and so the superintendent does not insist on his performance of the duty. The trainmaster's need of an assistant or of a half-dozen inspectors is disregarded because the directors think the financial result would be worse, if more officers were employed, than it is with an occasional collision. Engineers and conductors who lack conscientiousness would not enforce the rules on themselves, unless constantly watched, even if the trainmaster taught them, and on account of this the officers sometimes sit down and fold their hands. But these considerations and all others combined fail to excuse the sacrifice of life and limb from the causes now under consideration, which we are compelled to read in the public prints almost daily. As long as railroads make the safety of a train depend upon the joint responsibility of two men, it is the duty of the managers, when it is clear that one or the other of these men is constantly shirking his share of the care, to take effective measures to correct him. Public sentiment clearly recognizes this principle, and would undoubtedly enforce compliance with it, only it does not know how. But this does not alter the railroad officer's duty.

The Uniform Classification.

As our readers know, the new uniform classification as adopted by the Standing Committee in June has been printed and submitted to the various traffic associations for approval. The proposed classification is accompanied by a letter of explanation and recommendation which does credit to the fairness and the wisdom of the committee in charge. Eleven classes are provided for, the last six being almost entirely for carloads. The main features are thus seen to resemble the Western classification rather than the Official. Indeed, a comparison of the Uniform (with the rates suggested) with the Official shows a small advance in charge wherever changes have been made. This advance is most noticeable in the rates for carloads; thus sugar and coffee in carloads under the proposed plan will be 30 cents instead of 25 cents, New York to Chicago. If we are to have uniformity at all, we must expect that all changes will be in the direction of a compromise between existing classifications. Thus the rates proposed to be charged under the new classification on the article just mentioned by way of illustration—sugar—are higher than by the tariffs now in force, probably as a concession to the Western roads. Probably, as the items in the new tariffs become known, it will be found, as usual in compromises, that nobody is well pleased. Nevertheless, the feeling in Congress for some sort of uniformity is so strong that no one should antagonize it for light reasons.

Yet uniformity in the strict sense cannot be expected. Our country is too large, and the varied interests of the different sections and their railroads are too diverse to allow of such a thing. Evidently, therefore, if a common classification is to stand any chance of universal adoption, we must have commodity rates. The committee in charge realized this fully, and in their report the members admit the necessity of such commodity rates, but urge the associations to make as few as possible. This is the only practicable view to take. Cotton, for instance, cannot be moved from South to North at third class local rates, though this classification is fair enough for a local carriage only. Hence a special tariff for cotton is inevitable, and so with other staple products. Yet the warning of the committee is proper, because a great many articles have moved at low rates heretofore, not so much because the traffic demanded it, as for the reason that a war-time concession has been continued during peace. Shippers of such articles, finding their rates advanced by the uniform classification, will clamor for a commodity rate. Such demands should be challenged at every point and sparingly granted. Coffee, for instance, had no carload rate for years. Since 1887 it has had as low a carload rate as sugar or other cheap stuff, differing entirely in character. There is no really good reason for this. Canal and lakes or the Mississippi River can hardly be such formidable competitors as in other articles; and at all events no reduction in the more costly and delicate commodities need be made until actual experience has demonstrated a necessity for it. The danger of unlimited commodity rates, of course, is that we shall have worse confusion than before and may find ourselves in this respect out of the frying pan and in the fire. The necessity, under present conditions, of consulting two or three classifications in order to carry a carload of freight from New York to New Mexico is a great annoyance, to be sure; but so is the necessity of crossing the Allegheny Mountains, of bridging the Mississippi River and of reducing speed to six miles an hour through cities. It is not yet clear whether an arbitrary decision by a committee or by the Interstate Commerce Commission, or even by Congress, can completely remedy the former difficulty any more than it can the latter. To meet such a case as the carload lot controversy between New York and Western jobbers two or more classes of commodity rates might be necessary, and the danger of violating the long and short haul section of the law, which has been the immediate practical incentive to the progress toward uniformity thus far made, would then be increased instead of diminished.

The announcement of this classification will, of course, bring out a certain amount of disputing among associations and among shippers. The latter, if given notice months ahead (as should be done where so many and important changes are involved) will accommodate themselves to small alterations in the rates. A long notice before adoption will take out much of the sting. The Bill-of-Lading controversy should show the necessity of not only making such notice and "firing" it at the public, but of seeing that shippers actually give thought to it.

Uniformity of tariffs is an important desideratum even in comparatively unimportant outward matters, such as book work, nomenclature, prefatory rules, etc., and this committee's work therefore deserves to stand, and to be utilized as far as possible, even if it take years to agree upon its value as a whole. And finally we must not forget the liability that the national government may try to make a classification for the railroads and force it upon them, a thing to be dreaded by the carriers, and which ought to be dreaded by shippers.

July Accidents.

Our record of train accidents in July, given in this number, includes 84 collisions, 59 derailments and 6 other accidents, a total of 149 accidents, in which 70 persons were killed and 249 injured.

These accidents are classified as follows:

COLLISIONS:		
Rear	42	
Butting	27	
Crossing and miscellaneous	15	
		— 84
DERAILMENTS:		
Broken rail	1	
Loose or spread rail	5	
Broken bridge	3	
Broken wheel	1	
Broken axle	3	
Broken brakebeam	1	
Misplaced switch	5	
Runaway train	1	
Cattle on track	7	
Insects on track	2	
Washout	1	
Wind	3	
Malicious obstruction	1	
Accidental obstruction	4	
Unexplained	21	
		— 59
OTHER ACCIDENTS:		
Broken parallel or connecting rod	1	
Miscellaneous	5	
		— 6
Total number of accidents		149

The causes of collisions, where given, were as follows:

	Rear.	Butting.	Crossing and other.	Tot'l.
Trains breaking in two	..	1	..	1
Misplaced switch	4	2	..	6
Failure to give or observe signal.	7	1	2	10
Mistake in giving or understanding orders	..	6	..	6
Miscellaneous	8	2	7	17
Unexplained	23	15	6	44
Total	42	27	15	84

A general classification shows:

	Collisions.	Derailments.	Other.	Total.	P. c.
Defects of road	..	9	..	9	6
Defects of equipment	2	5	4	11	8
Negligence in operating	38	6	..	44	29
Unforeseen obstructions	..	18	2	20	13
Unexplained	44	21	..	65	44
Total	84	59	6	149	100

The number of trains involved is as follows:

	Collisions.	Derailments.	Other.	Total.	P. c.
Passenger	38	21	5	64	28
Freight and other.	130	38	1	169	72
Total	168	59	6	233	100

The casualties may be divided as follows:

KILLED.	Collisions.	Derailments.	Other.	Total.
Employés	32	14	1	47
Passengers	10	3	..	13
Others	10	..	..	10
Total	52	17	1	70
INJURED.				
Employés	74	41	1	116
Passengers	62	35	..	97
Others	30	6	..	36
Total	166	82	1	249

The casualties to passengers and employés, when divided according to classes of causes, appear as follows:

	Pass. killed.	Pass. injured.	Emp. killed.	Emp. injured.
Defects of road	..	9	1	5
Defects of equipment	2	2	2	3
Negligence in operating	10	64	34	77
Unforeseen obstructions and maliciousness	..	16	9	28
Unexplained	1	6	1	3
Total	13	97	47	116

Thirty-seven accidents caused the death of one or more persons, and 41 caused injury but not death, leaving 71 (47 per cent. of the whole) which caused no personal injury worthy of record.

The comparison with July of previous years shows:

	1890.	1889.	1888.	1887.
Rear collisions	42	36	29	26
Butting "	27	28	27	33
Crossing and other collisions	15	8	5	2
Derailments	59	68	86	53
Other accidents	6	3	10	3
Total "	149	143	157	117
Employés killed	47	29	48	49
Others "	23	10	12	17
Employés injured	116	73	92	107
Others "	133	74	77	167
Passenger trains involved	64	62	63	54
Average per day:				
Accidents	4.81	4.61	5.06	3.77
Killed	2.26	1.26	1.93	2.13
Injured	8.03	4.74	5.45	8.74
Average per accident:				
Killed	0.469	0.273	0 382	0 569
Injured	1.672	1.028	1.077	2.317

The most fatal accident of the month was that at King's Mills, O., on the 15th, where a dozen persons were killed or fatally injured, and many more badly hurt by a powder explosion. It seems that the freight cars which caused the explosion came together with a shock which, under ordinary circumstances, would be regarded as by no means violent; and yet the collision

unmistakably comes within the class of accidents embraced in our records. The killing of the brakeman and the destruction of the cars render the discovery of the precise cause impossible, but so far as has been ascertained, there was no defect in the brake rigging. There were six train accidents during the month in which passengers were killed, though four of them involved only freight trains. The engineer of the train which ran into another in Chillicothe, Mo., was held in $500 bonds. The crossing collision at Sibley, Ark., on the 9th, where four passengers were killed, seems to have resulted from pure carelessness on the part of the men handling one or both of the trains, but the evidence as printed in the newspapers is so poorly reported and so contradictory that it is impossible to form a decided opinion. Two separate juries have rendered conflicting verdicts and the heirs of the victims have entered suits against both roads. The derailment at Manteno, Ill., on the 7th, is classed as unexplained. There was much discussion about a broken switch-rod bolt, and the possibility of its having been maliciously withdrawn from its place, but nothing definite is published. The passenger killed in this derailment was riding on the platform.

Two very unusual causes appear in the list this month. The murder of an engineer by his fireman at Fort Wayne, on the 18th, and the wrecking of two trains at Carracas, Col., on the 6th by swarms of locusts on the track, by which the peripheries of the wheels were so lubricated that the brakes would not hold. We have not seen full particulars of these derailments, but the account seems reasonable enough. It is to be remembered that similar difficulties, reported in previous years, have occurred at points where the grade was moderate and the trains did not become wholly uncontrollable. The combination of locusts and steep mountain grades may well be regarded as a terror. Besides the complete overturning of a long passenger train by a cyclone at Fargo, N. D., there were serious disturbances by winds at Peoria, Ill., on the 17th, and North Wakefield, N. H., on the 31st. At Peoria a number of freight cars were overturned, and at North Wakefield a heavy passenger train was saved from running into some large trees by Mrs. Emily Branson, who flagged the train with a towel.

Fatalities at grade crossings were particularly numerous during July. Although these do not come within the list of train accidents, we noted some of the principal cases and find that 25 persons were killed in eight of this class of accidents. This includes only those cases in which two or more persons were killed. One of these, near Pittsburgh, the 25th, killed only one person directly, but frightened some laborers nearby so that they dropped a heavy pipe into a ditch, killing two more men. At Sadieville, Ky., on the 17th, a conductor and two brakemen repairing a drawbar were all fatally injured by the car being moved while they were under it. Some further reflections on the accidents of the month will be found in another column.

Some time since the British Commissioners of Inland Revenue thought themselves entitled to make an annual charge of 5 per cent. upon the yearly value, income or profits accruing from the real or personal estate of the Institution of Civil Engineers, which was permanently invested. Mr. James Forrest, their able secretary, naturally contended that the Institution was exempt from the tax on the ground that its funds were applied to the promotion of science. On trial the views of the commission were sustained, but on appeal this decision was reversed, and in the House of Lords the decision of the appellate court was sustained, thus settling the fact that an engineering society promotes science. In the House of Lords the Lord Chancellor thought that the Institution was constituted for the benefit of persons who are civil engineers, to facilitate their work, to instruct them better in their profession, and to make them better able to perform and practice the art by which they were to make their livelihood. Lords Watson and Macnaughton thought that civil engineering was a science in which advantage is only to be expected from conferences of specialists, and that the advantages which accrue to the individual members are subsidiary to and growing out of the main objects.

The Delagoa Bay Railroad, which was confiscated by the Portuguese government for non-completion, has a great part of its value destroyed by an agreement between President Paul Krüger, of the Transvaal Republic, and Lord Salisbury, by the terms of which the Boers relinquish their claims to the territory north of the Limpopo, or the Matabele country, in return for which they secure a right of way for a railroad of their own through Switzerland to the Indian Ocean at a point about midway between Delagoa Bay and the Bay of Santa Lucia. The damage to the builders of the Delagoa Bay road, through its confiscation by the Portuguese government, is about being determined by arbitration before several Swiss jurists. But with the Boers in possession of a road and port of their own, the possible award is the greatest value of the existing road, and an application has been made before a London court for a receiver. As Colonel McMurdo, the builder of the railroad, was an American, operating a Portuguese concession with English capital under a Dutch charter for a road the English did not then want built to the Transvaal Republic, the situation was at one time slightly international.

Mr. Hammond, in writing of the new interlocking plant of the Boston, Revere Beach & Lynn, says: "The position *and* color signal, which the parabolic semaphore so happily combines, is used, and although the position of the semaphore is considered of chief importance, the color signal is by no means deemed valueless. The contrast, particularly at night, between the red horizontal and white inclined signal is so pronounced, not to say startling, that the feeling is that no change to a position signal, merely, is at present advisable."

Train Accidents in July.

COLLISIONS.

REAR.

3d, at 10 p. m., on the elevated structure of the Pennsylvania, in Philadelphia, a passenger train ran into the rear of an empty passenger train which had stopped, and threw the two rear cars into the street, 30 ft. below. The cars were totally wrecked and the engine was disabled.

4th, night, on Chesapeake & Ohio, at Russell, Ky., a passenger train collided with a freight car, which had been blown out of a siding in a gale. The engine was badly damaged and the baggage and express cars and two coaches were overturned. Engineer, fireman and a passenger injured.

7th, on East Tennessee, Virginia & Georgia, near Kymulga, Ala., passenger train ran into the rear of a disabled freight, damaging the locomotive. Engineer hurt.

7th, on Norfolk & Western, near Max Meadows, Va., a passenger train ran over a misplaced switch and into the rear of a construction train standing on a side track, doing considerable damage. Fireman and postal clerk injured.

7th, on Denver & Rio Grande, at Pueblo, Colo., a passenger train collided with a work train entering a siding, doing considerable damage. Engineer and 5 passengers injured.

7th, on New York, Ontario & Western, at Gilletts, N. Y., a passenger train ran into the rear of an accommodation train, damaging engine and rear coach. Two passengers injured.

8th, on New York Central & Hudson River, near Hudson, N. Y., an empty engine ran into the rear of a freight train, damaging caboose and several cars. Brakeman injured.

8th, on Illinois Central, at Monee, Ill., a passenger train collided with a freight car standing on the main track, doing some damage.

9th, on Norfolk & Western, near Salem, Va., a freight train ran into the rear of a preceding freight, doing some damage.

10th, on St. Louis, Iron Mountain & Southern, in St. Louis, Mo., a passenger train collided with some freight cars, doing some damage.

12th, on Denver & Rio Grande, near Florence, Col., a passenger train ran into the rear of a freight train, derailing locomotive and damaging several cars. Two passengers injured.

13th, on Louisville, New Albany & Chicago, at New Providence, Ind., a freight train dashed into the rear car of another freight entering a siding, badly wrecking the engine, killing the engineer and seriously injuring the fireman.

13th, on Chesapeake & Ohio, at Gladstone, Va., a passenger train ran over a misplaced switch and into the rear of a freight train, wrecking engine and caboose and derailing several cars in each train. A trainman and a tramp stealing a ride on the baggage car trucks were killed and 5 trainmen injured.

14th, on Atchison, Topeka & Santa Fe, at Dodge City, Kan., passenger train No. 3 ran over a misplaced switch and struck a switch engine, badly damaging both locomotives. One fireman and a tramp were killed.

14th, on Hannibal & St. Joseph, at Chillicothe, Mo., a local freight train standing at the station was run into at the rear by a fast stock train. A woman who was just stepping on to the caboose of the local freight was killed and another passenger and a brakeman were fatally injured.

14th, on Baltimore & Ohio, near Wilmington, Del., a passenger train collided with some freight cars standing on the main track, wrecking engine and 3 cars. Brakeman injured.

15th, on New York, Pennsylvania & Ohio, near Ashland, O., westbound passenger train No. 5 ran into the rear of a preceding freight train which had stopped where the view was short. Engine, caboose and 3 freight cars wrecked. It is said that the flagman did not go back far enough.

15th, on Chicago, Burlington & Quincy, near Burlington, Ia., a fast freight train ran into the rear of a preceding freight, doing considerable damage.

16th, on Baltimore & Ohio, near Hartford, Md., a southbound freight train ran into the rear of a preceding freight which had become stalled on a grade, wrecking 20 loaded cars. Fireman and a brakeman killed.

17th, on Central of Georgia, near Macon, Ga., a freight train ran into the rear of a switching engine which was using the main track on the time of the freight. Engineer slightly injured.

17th, on Indianapolis, Decatur & Western, near Decatur, Ill., freight train ran into rear of a preceding freight. Two men in charge of horses were killed and another one injured.

17th, on Cincinnati, Wabash & Michigan, at Wabash, Ind., passenger train No. 3 ran into the rear of freight No. 13, which had become stalled on a grade. The caboose was wrecked, but no wheels were derailed The collision occurred on the bridge over the Wabash River.

17th, on Louisville & Nashville, at Cincinnati, O., a freight train became unmanageable on a steep grade and ran into some box cars, wrecking engine and four cars.

17th, on Cincinnati, Hamilton & Dayton, at Cincinnati, O., collision between a passenger train and a switching freight, doing some damage.

18th, night, on Cincinnati, Jackson & Mackinaw, at Fort Wayne, Ind., a passenger train ran past the station and over a grade crossing, barely missing a passenger train on the Pittsburgh, Fort Wayne & Chicago, and ran into a freight engine standing in the yard. Both engines were wrecked, and the cars of the passenger train badly damaged. The train was running at uncontrolled speed because the engineer, Madison Vandevander, had been beaten on the head with a hammer, and was lying in the cab unconscious. Both he and Fireman Roadhouse were taken from the wreck in an unconscious condition, and the engineer died the next day. The fireman at first said that train robbers had attacked the engine, but later confessed that he himself had killed his mate. It appears that there had been a feud between the men for some time. Roadhouse claims to have struck the engineer in self-defence.

19th, on Connecticut River road, near North Charlestown, N. H., a northbound express train ran into the rear of an extra freight, damaging engine and wrecking caboose and 2 cars. Three trainmen injured.

19th, at 10 p. m., on New York, Ontario & Western, near Cooks Falls, N. Y., a train of new passenger cars and cabooses, which had been stopped by a danger signal, was run into at the rear by express freight No. 29. Two of the new passenger cars and the engine and 12 loaded freight cars were derailed and thrown down a high bank. Engineer killed and 3 trainmen injured. Much of the wreck was burned up by oil from one of the cars.

21st, on St. Louis, Iron Mountain & Southern, at Malvern, Ark., the rear portion of a freight train which had stopped to do some switching was run into by a following freight, wrecking caboose and several cars. A passenger in the caboose was killed.

21st, on Union Pacific, at Rockford, Wash., a work train ran into the rear of a standing freight, making a bad wreck. Two trainmen injured.

22d, night, on Central Vermont, near Windsor, Vt., a standing freight train was run into at the rear by a mixed train, badly damaging the engine and several flat cars.

22d, on Chicago, Rock Island & Pacific, near Willard, Kan., a freight train broke in two and the rear portion was run into by a passenger train, wrecking engine, express and smoking cars and caboose and a number of box cars. Several trainmen and a number of passengers injured.

22d, on Chicago & Northwestern, at Malta, Ill., a passenger train ran over a misplaced switch and into some freight cars standing on a side track, wrecking the locomotive. Fireman killed and engineer badly hurt.

24th, on Milwaukee, Lake Shore & Western, at Clintonville, Wis., a freight train ran into the rear of another freight, wrecking engine, caboose and 3 cars.

24th, on Toledo & Ohio Central, at Thurstons, O., a freight train ran into the rear of a standing freight, wrecking engine and 6 cars, injuring a trainman.

25th, on Louisville Southern, near Stine, Ky., a freight train ran into the rear of another freight, wrecking engine and half a dozen cars.

25th, on Union Pacific, at Layton, Utah, a special passenger train ran into the rear of a preceding freight, slightly damaging several cars. Engineer injured by jumping and 3 passengers slightly hurt.

26th, on New York, Pennsylvania & Ohio, near Silver Creek, N. Y., a freight train ran into the rear of another freight in a deep cut on a sharp curve, ditching the colliding engine and wrecking caboose and a number of cars containing oil. The oil ignited and the caboose and 2 cars, together with the combustible portion of the engine, were burned. A boy riding in the caboose was killed.

28th, on Chicago & Northwestern, near Waukegan, Ill., passenger train ran into the rear of a freight train, doing slight damage.

29th, on New York, Lake Erie & Western, near Harrison, N. J., four cars of a freight train broke loose and ran back down grade into the head of a following freight, wrecking engine and 6 cars.

29th, on Columbus, Hocking Valley & Toledo, near Delaware, O., a freight train ran into the rear of another freight on a trestle. Several cars were tipped off into the creek and wrecked, and the trestle was badly damaged.

30th, on Cleveland & Pittsburgh, at Empire, O., a freight train which had stopped to do some switching was run into at the rear by a following freight, the engine and several cars being wrecked. The track was blocked for nearly 12 hours. It is said that the foremost train neglected to send out a flagman.

30th, on Illinois Central, near Cobden, Ill., a freight train ran into the rear of a construction train, wrecking engine and 10 cars. One trainman injured by jumping.

BUTTING.

2d, on Pennsylvania, near Hyndman, Pa., butting collision between two freights, doing considerable damage.

4th, on Central of Georgia, near Anderson, Ga., butting collision between two freight trains, one of which failed to obey orders to take a siding. Fireman killed.

5th, on Louisville & Nashville, near Sparta, Ky., butting collision between two freight trains, wrecking the forward portion of both. Two trainmen injured.

5th, on Grand Rapids & Indiana, near Bayview, Mich., butting collision between a passenger train and a freight train, wrecking the engines and a number of cars in each train. Ten passengers were injured, some of them in leaping from the train.

6th, on Central Pacific, at Lucine Siding, Nev., a passenger train ran over a misplaced switch and into the head of a freight train standing on a siding, wrecking 3 engines. Fireman and 7 passengers injured.

6th, 12:20 a. m., on Philadelphia, Wilmington & Baltimore, near Cheswold, Md., butting collision between two freight trains, owing to the crew on one of them misreading orders. Both engines and 9 cars wrecked.

8th, on Chicago, Milwaukee & St. Paul, at Hastings, Minn., butting collision between an empty passenger train and a yard engine. The yard engine, the cab of which had been abandoned and the throttle of which had been opened by the shock, ran back and collided with a string of freight cars. Two engines and several cars were wrecked and a trainman slightly injured.

8th, on Georgia Pacific, near Temple, Ga., butting collision between a freight train and a construction train, wrecking the engines and several cars of both. The engineer of the freight was killed and a brakeman badly hurt. It is said that the runner of the freight, on being flagged, called out to the flagman as his train passed, "I've got my orders and am on time. The track is mine and they will have to clear the way."

8th, on Louisville & Nashville, at Clear Creek, Ala., butting collision between passenger train and extra freight, badly wrecking the forward portions of both trains. Five trainmen killed and another badly hurt. It is said that the passenger train neglected to take a siding as ordered.

11th, on Union Pacific, at Denver, Colo., collision between incoming freight train and a switching freight moving backward, doing considerable damage.

11th, on Chesapeake & Ohio, near Scottsville, Va., butting collision between two freights, due to misinterpretation of orders. Engines and 6 cars wrecked.

13th, on Pittsburgh, Cincinnati & St. Louis, near Madisonville, O., butting collision between a passenger train and a construction train, due to misunderstanding of orders, wrecking both locomotives and injuring 5 trainmen.

13th, on Union Pacific, at Crook, Col., butting collision between two freights, disabling the engines and derailing several cars. Two trainmen injured.

14th, on Louisville, New Albany & Chicago, near

Smithville, Ind., butting collision between an accommodation train and a freight, wrecking the forward portion of both, injuring 8 trainmen and 9 passengers. It is said that the accident was caused by the watch of one of the conductors stopping.

16th, 1 a. m., on Atchison, Topeka & Santa Fe, near Olathe, Kan., butting collision between two freights running at speed, wrecking both engines and 8 cars. Engineer killed and 3 trainmen injured.

16th, on Delaware, Lackawanna & Western, at Newark, N. J., freight train ran into 2 cars which had broken loose from a switching freight. Two brakemen were fatally injured.

16th, on Atchison, Topeka & Santa Fe, near Edgerton, Kan., butting collision between freights, due to a dispatcher's mistake, wrecking both engines and 23 cars. Engineer killed and fireman badly injured.

21st, on Denver and Rio Grande, near Red Cliff, Col., butting collision between a passenger train and a light engine, damaging 3 locomotives. Two trainmen and another employé of the road injured.

21st, on Union Pacific, near Meacham, Ore., butting collision between a double-header freight and an empty engine. Three engines and 12 cars wrecked.

21st, on Old Colony, at North Dartmouth, Mass., butting collision between a freight train and a work train, wrecking 6 cars.

22d, on Milwaukee, Lake Shore & Western, at Antigo, Wis., butting collision between freight trains, killing 3 and injuring 1 trainmen.

23d, on Louisville & Nashville, at Birmingham, Ala., a yard engine ran over a misplaced switch and into the head of a freight train, damaging both engines. Engineer hurt.

25th, 2 a. m., on Cincinnati, Hocking Valley & Toledo, near Fostoria, O., butting collision between freight second 56 and freight 49, wrecking both engines and 10 cars. Second 56 had orders to wait for the other train at Fostoria, but the engineer pulled out under the impression that 49 had arrived. It is stated that train 49 displayed no headlight.

27th, on Milwaukee, Lake Shore & Western, near Tigerton, Wis., butting collision between 2 freight trains while running at full speed on a sharp curve, making a very bad wreck. Two trainmen killed and 4 injured. Conflicting orders is given as the cause.

27th, on Cleveland & Pittsburgh, at Toronto, O., butting collision between 2 freights, due to a mistake in orders, doing slight damage.

27th, on Atchison, Topeka & Santa Fe, at Canon City, N. M., butting collision between a passenger train and a freight train, overturning and wrecking both engines and derailing several cars in each train. Engineer killed, fireman and express messenger injured.

31st, on New York, Ontario & Western, at Germyn, Pa., butting collision between a freight train and a work train, killing four laborers.

CROSSING AND MISCELLANEOUS.

9th, at the crossing near Sibley, Ark., a Kansas City, Memphis & Birmingham passenger train was run into by a Little Rock & Memphis freight, demolishing one coach and derailing a number of others. Four passengers killed and a dozen injured.

10th, on Louisville & Nashville, near Birmingham, Ala., collision between an excursion train moving backward and a locomotive, damaging the rear coach. Five frightened passengers were injured in scrambling to escape from the car.

11th, night, at the crossing near Rome, Ga., a Chattanooga, Rome & Columbus freight was not controlled and ran into an East Tennessee, Virginia & Georgia freight, wrecking engine and a number of cars.

14th, on Maine Central, at Thorndike, Me., 3 cars of a freight train were badly damaged by a collision whi e making a flying switch, a brake chain having broken on one of the cars. Two trainmen injured.

14th, on the Old Colony road, at Canton Mass., a passenger train was struck by a construction train, damaging one coach and injuring a passenger.

15th, night, on Chicago, Burlington & Quincy, near Burlington, Ia., passenger train ran into the side of a freight train which was backing on to a turnout. The passenger engine and baggage car and several freight cars were derailed.

15th, p. m., on Western New York & Pennsylvania, near Genesee Junction, N. Y., a West Shore freight train ran into the side of a Western New York & Pennsylvania freight, near the crossing of the two roads. Engineer and fireman jumped, but were fatally injured.

15th, afternoon, on Pittsburgh, Cincinnati & St. Louis, at Kings Mills, O., two box cars, being thrown on to a siding by a flying switch, struck some cars loaded with powder with such force as to cause the contents of two of them (16 tons) to explode in rapid succession. The station building and a number of manufacturing establishments and dwellings were wrecked, set on fire and burned up. A brakeman standing on one of the cars and 8 persons working in the vicinity were killed, and 32 other persous were more or less severely injured, 3 of whom have since died.

15th, at Detroit, Mich., collision between Lake Shore & Michigan Southern and Detroit, Grand Haven & Milwaukee switching engines, disabling both.

19th, on Milwaukee, Lake Shore & Western, at Manitowoc, Wis., a switching engine ran into a car standing in the yard, doing some damage, injuring an employé.

22d, on Central of New Jersey, near Red Bank, N. J., two freight trains attempted simultaneously to back on to the main track from different sidings and demolished the cabooses.

23d, at a crossing in Chicago, Ill., a Chicago Belt special passenger train ran into a Chicago & Western Indiana freight, owing to the runner of the former disregarding signals. Engine and a flat car damaged. Three trainmen and a man in an adjacent building were injured, the latter being struck by a piece of a broken crossing gate.

24th, at the crossing near Denver, Col., an Atchison, Topeka & Santa Fe passenger train ran into a Denver, Texas & Fort Worth freight, wrecking engine and overturning 6 box cars. It is said that the air brakes of the passenger train did not work properly.

28th, at Terra Haute, Ind., collision between Evansville & Terra Haute freight train and a Cleveland, Cincinnati, Chicago & St. Louis locomotive, killing an engineer.

31st, at the junction of the Louisville & Nashville and Kentucky Midland, at Frankfort, Ky., a runaway train of the latter road ran into some freight cars of the former, wrecking 2 cars and damaging the engine.

DERAILMENTS.

DEFECTS OF ROAD.

2d, on New York, New Haven & Hartford, near New Canaan, Conn., passenger train derailed by the spreading of the rails and overturned in the ditch.

2d, on Union Pacific, near Mosher, Or., a freight train ran on to a burning bridge and the engine and 3 cars broke through it and were wrecked, the combustible parts being burned up.

8th, on Louisville & Nashville, near Henry, Tenn., engine and several cars of a construction train broke through a trestle.

8th, on Union Pacific, near Boreas, Col., two cars of a freight train thrown from the track by the spreading of the rails and overturned down the side of a mountain, wrecking them completely.

10th, on St. Louis, Iron Mountain & Southern, near Tucker, Mo., freight train thrown from the track by the spreading of the rails, wrecking a number of cars.

21st, on Union Pacific, near Medicine Bow, Wyo., passenger train thrown from the track by the spreading of the rails.

21st, 11 p. m., on Chicago, Rock Island & Pacific, near Limon, Col., engine and 3 cars of a passenger train running at speed were precipitated into a swollen stream where a bridge 30 ft. long and 15 ft. high had been washed away. Engineer killed and 4 trainmen and 9 passengers injured. There had been little rain along the line of the road near the bridge and it is believed that the wreck of the bridge resulted from a "cloudburst."

22d, on Union Pacific, at Emery, Wy., a coal train was thrown from the track by the spreading of the rails and 14 cars were piled up in a bad wreck.

28th, on Georgia Midland & Gulf, near Griffin, Ga., 4 cars of a freight train thrown from the track by a broken rail, injuring a brakeman.

DEFECTS OF EQUIPMENT.

6th, on Union Pacific, near Shoshone, Idaho, as a double-header freight train was descending a steep grade an axle under the tender of the foremost engine broke and the other locomotive, together with a number of cars, was derailed and ditched. A drover was killed and a fireman and 2 other drovers were injured.

6th, on the Texas & Pacific, near Collinsville, Tex., a freight train was derailed on a bridge by the breaking of a wheel, causing the structure to give way and precipitating 13 cars into the creek.

10th, on Housatonic road, at Bridgeport, Conn., 4 cars of a freight were derailed by a brake-beam dropping and disarranging a switch.

11th, on Ohio River road, near Ravenswood, W. Va., 15 cars of a freight train were derailed and wrecked by the breaking of a journal. One trainman killed and 3 tramps injured.

30th, on Georgia Pacific, at Holly Point, Miss., several cars of freight train derailed by a broken axle.

NEGLIGENCE IN OPERATING.

12th, on New York Central & Hudson River, near Medina, N. Y., a passenger train struck a misplaced switch at a private siding and the engine ran off the end of the track and crashed into a warehouse. The cars were not derailed. It is supposed that the switch had been maliciously misplaced.

17th, on Atchison, Topeka & Santa Fe, near Lama Junction, N. M., a freight train became uncontrollable in descending a steep grade and was derailed and wrecked at a curve. Fireman and brakeman killed and engineer and 2 stockmen injured.

20th, on Northern Pacific, at Tacoma, Wash., yard engine derailed at an unfastened switch.

22d, on Zanesville & Ohio River road, near Zanesville, O., a freight train of 4 cars, being pushed by an engine, ran over a hand car and was derailed. Two trainmen and a lumberman injured.

23d, on East Tennessee, Virginia & Georgia, at Mossy Creek, Tenn., passenger train derailed by a misplaced switch.

27th, on Chicago, Milwaukee & St. Paul, at Kilbourn, Wis., a baggage truck was struck by a mail bag thrown off a swiftly moving passenger train, and fell off the platform underneath the cars, derailing of them.

29th, on Central of Georgia, near Macon, Ga., locomotive of a switching freight derailed by a misplaced switch.

31st, night, on Cleveland & Pittsburgh, at Smith's Ferry, Pa., a part of a freight train was turned upon a side track by an unfastened switch, 3 cars being derailed.

UNFORESEEN OBSTRUCTIONS.

1st, on Queen & Crescent Route, near Pachuta, Miss., a passenger train ran over a cow, derailing and damaging engine, baggage and express cars.

6th, on Denver & Rio Grande, near Carracas, Colo., a construction train, consisting of engine and one car, filled with laborers, in descending a steep grade became uncontrollable at a point where locusts had swarmed upon the rails, and ran at high speed to a curve, where it was derailed, hurled against the mountain and completely wrecked.

An engine with a gang of men dispatched to the wreck met a similar fate. Three men killed and 15 injured.

7th, at 2.30 a. m., on Northern Pacific, at Fargo, N. D., a passenger train leaving the station was struck by a cyclone and all the cars were overturned, injuring 19 passengers and trainmen, none of them seriously.

8th, on Louisville & Nashville, near Magella, Ala., a passenger train ran over a steer, derailing 2 cars.

10th, on East Tennessee, Virginia & Georgia, near Talladega, Ala., a freight train ran over a steer and the engine and 10 cars were derailed and damaged.

10th, on Louisville, New Albany & Chicago, near Salt Creek, Ind., passenger train derailed by running into a tree which had been blown down across the track.

10th, on Florida Central & Peninsular, near Madison, Fla., a mixed train ran into a tree which had been blown down across the track, causing engine and 6 box cars to leave the track and go over an embankment.

11th, on Housatonic road, in Birmingham, Conn., a passenger train ran into a circus wagon which had got stuck upon a crossing, derailing the front trucks of the engine.

11th, night, on Wilmington Sea Coast road, near Hammock's, S. C., the tender of a passenger train was derailed at a frog which had been tampered with, and was overturned in the ditch. Engineer hurt.

15th, on Chicago, Burlington & Quincy, at Hegener, Ill., freight train derailed and wrecked at a washout. Brakeman killed.

17th, on St. Louis, Arkansas & Texas, near Omaha, Tex., a work train with the engine at the rear end was derailed by running over a horse. Conductor and one brakeman killed.

19th, on Cincinnati, New Orleans & Texas Pacific, near Vicksburg, Miss., a passenger train ran over some cattle, and the forward portion of the train, including 2 coaches, was derailed and upset. Trainman injured by jumping.

20th, on Louisville, New Albany & Chicago, near Delphi, Ind., a passenger train ran over a cow, derailing engine and 3 cars. The engine was overturned in the ditch and badly wrecked, killing the engineer and injuring fireman.

28th, on Louisville & Nashville, near Sulphur, Ky., a freight train ran over a horse which had got caught in a bridge, and the engine was derailed and overturned in the ditch, killing the fireman and badly injuring the engineer and a brakeman.

30th, on Philadelphia & Reading, in Tenth street, Philadelphia, a car in a switching freight was derailed by a stone upon the track. Conductor and brakeman injured and a small building demolished. The stone was carelessly left upon the track by men engaged in paving the street.

UNEXPLAINED.

1st, on Richmond & Danville, near Norcross, Ga., freight train derailed and 3 cars wrecked. Brakeman injured.

1st, on Central of New Jersey, at Plainfield, N. J., engine of freight train derailed at a frog.

5th, on Kansas City, Memphis & Birmingham, at Cordova, Ala., freight train derailed.

6th, on Louisville & Nashville, near Louisville, Ky., 2 cars of a freight train derailed at a switch.

7th, on East Tennessee, Virginia & Georgia, near Kymulga, Ala., car of freight train derailed.

7th, on Illinois Cen ral, at Maneto, Ill., an excursion train running about 35 miles an hour was derailed at a defective or unfastened switch. One car was thrown crosswise of the track and, together with a number of others, badly damaged. A passenger riding on the platform of one of the cars was killed and 5 other passengers were injured.

8th, on Georgia Pacific, at Salt Springs, Ga., engine derailed on a side track.

8th, on Meadville and Linesville, at Watson Run, Pa., 4 cars of an excursion train were derailed, one of them being overturned in the ditch, injuring a passenger.

14th, on Chicago & West Michigan, near Irons, Mich., engine of construction train derailed. Two trainmen injured.

15th, night, on Boston & Maine, near Bridgewater, N. H., 8 cars of a freight train derailed, blocking the road half a day.

17th, on Kansas City, Fort Scott & Memphis, near Mansfield, Mo., engine and 6 cars of freight train were derailed at a curve and wrecked, killing the fireman.

19th, on Central of Georgia, near Albany, Ga., freight train derailed. One brakeman killed.

20th, on Northern Pacific, at Tacoma, Wash., passenger train derailed.

20th, on Baltimore & Ohio, near New Concord, O., freight train derailed, 7 cars being ditched.

22d, on Kansas City, Memphis & Birmingham, near Amour, Miss., tender of engine of passenger train derailed.

23d, on Duluth, South Shore & Atlantic, near Ishpeming, Mich., engine and several cars of passenger train derailed and ditched.

24th, on Southern Pacific, near Nord, Cal., 5 cars of a passenger train derailed, injuring 2 tramps.

28th, on Kinderhook & Hudson, near Mossman's, N. Y., the engine of a construction train was derailed on a trestle and tipped off into the creek. Two trainmen injured.

29th, on Columbus & Western, at Birmingham, Ala., 3 cars of coal train derailed and wrecked.

30th, on Louisville & Nashville, near Franklin, Ky. several cars of freight train derailed.

30th, on East Tennessee, Virginia & Georgia, near Macon, Ga., 8 loaded cars in a freight train derailed.

OTHER ACCIDENTS.

14th, on Baltimore & Potomac, near Brandywine, Md., eccentric-rod of engine of passenger train broke and tore a hole in the firebox.

14th, on Pennsylvania road, near Kirkland Station, Pa. as a passenger train was passing underneath a highway bridge a large stone was dropped down upon and broke through that part of the roof of one of the coaches projecting over the platform, slightly injuring a brakeman.

16th, on Boston & Maine, near Berlin, Mass., parallel rod of engine of a fast passenger train broke, wrecking the cab.

17th, on Lehigh Valley road, near Allentown, Pa., the head-light and smoke-stack of engine of passenger train were knocked off by running into a telegraph pole which had been blown down across the track.

21st, on Pennsylvania road, near Frazer, Pa., a freight train broke in two, throwing a brakeman off the car on to the track and killing him.

30th, on Old Colony, at Boston, Mass., coupling between engine and tender of an express train broke, detaining the train an hour.

A summary will be found in another column.

New England Roadmasters' Association.

The eight annual convention of this Association was opened at the American House, Boston, on Aug. 20, at 2 p. m, President G. W. Bishop (Fitchburg) in the chair.

After the reading minutes of the last meeting and transacting other routine business the following officers were elected for the ensuing year:

President, W. E. Clark (Vermont Valley); Vice-President, F. C. Clark (Housatonic); Secretary and Treasurer, G. L. R. French (Boston & Maine); Chaplain, E. W. Horner (Central Vermont). Executive Committee: President, Vice-President, Secretary and Treasurer and C. B. Lentell (Boston & Albany); F. D. Holbrook (New York, New Haven & Hartford), E. W. Horner (Central Vermont), A. C. Stickney (Boston & Maine). The resignation of Mr. W. F. Ellis, the former Secretary of the Association, now with the Dunham Manufacturing Co., was accepted and a vote of thanks was tendered him for his faithfulness as Secretary for the past seven years. The committee reports were then read as follows:

The report of Messrs. J. W. Shanks, J. McManama and F. C. Clark, Committee on the Best Method of Repair in Winter and Spring, was to the effect that with a good roadbed the first consideration is to have enough men. Five miles of single track and four miles of double track should be the outside limit for the length of sections, and this length should be proportionately shortened by the amount of yard tracks that are to be cared for. (As to the number of men per mile we find that on roads where one man per mile is allowed the men have to work

fully as hard as on roads where only about one-half the number are employed.) On some roads the trackmen are required to do so much outside work that on the amount of labor directly chargeable to track work there would be a balance in favor of the latter. It is not economy for the sectionmen to do all outside work, or even the greater part of it. It destroys the ambition of the men, and ruins their pride in their section. The track force should be increased to the highest limit at the opening of spring, so as to get poor ties out and new ties into the track before the hot weather comes, or say by July 1, at which time the men relieved can find ready work at good wages.

The Committee on Inspection and Premiums, J. R. Patch and C. B. Lentell, reported in substance:

Each section master should send one reliable man over his entire section every morning, Sundays included, providing there are night or Sunday trains run; he also should send a man over his entire section after every storm or hard shower, either day or night. All section masters should inspect the whole road together once each year. There should be a yearly inspection of road by men competent to judge of its condition. First and second premiums should be offered to the section masters who make the best showing for the year, all things considered.

The Committee on Frogs and Switches, L. J. Spaulding and S. Bodwell, Jr., reported as follows:

The Tyler switch, with its castings, has had its day, as it is not in all cases a safety switch with the present heavy locomotives. The Cook switch is an improvement on the Tyler, and is, with its steel fittings in place of castings, a much safer switch; but there is still the stub switch, with its open joint in winter and tight in summer, with loose head block to be tamped every few days. The split switch, with an automatic stand, is as nearly perfect as any that has yet been introduced. No road can afford to use a stub switch on the main line.

The greatest cause for renewal of frogs is hollow wheels. The practice of some roads of taking worn-out wheels from passenger cars and putting them under freight cars is bad.

The Committee on Ties, R. Hyland and Wm. E. Clark, reported in favor of a standard tie 9 ft. long, 7 in. thick and 6-in. face or more. Ties to be equally spaced, with the large end under the inside rail on curves. Three thousand per mile under all weights of rail.

DISCUSSION.

In the discussion on the first report Mr. W. E. CLARK (Vermont Valley) said: Culverts should be cleaned out thoroughly. All culverts emptying toward the west freeze up if not banked. During the summer we dig deep and shim to obviate the necessity of shimming in winter. In the winter the shims are removed. We have had trouble in the spring with breaking through the frost and going into the mud. As soon as the frost is out of the ground ties are put in while the track is rough. We calculate to get the ties all in by the first of July.

Mr. R. HYLAND (Cheshire): With about 18 in. of gravel no breaking through will occur.

Mr. E. W. HORNER (Central Vermont): Shimming is time wasted. It would be a better investment for roads to put on sufficient ballast to prevent heaving.

Mr. J. S. LANE (late N. Y., N. H. & H.): Last year we had little frost or snow and little heaving. With rock ballast we got along with three or four men to the mile of double track. I should not want to take the responsibility of so small a number of men on a gravel ballasted road. Our sections were supplied with light hand cars, and we had no trouble in keeping the roadbed in good condition.

Mr. G. W. BISHOP (Fitchburg): Our passenger trains run as fast in winter as they do in summer, and our roadbed must be maintained. Our first trouble is sub-grading. Every time a train goes over the track it leaves a depression in the clay. Water will accumulate, and the track will heave in consequence of the water expanding. We should dig out the worst places and fill with gravel—it does not cost much, and in a few years your roadbed will be smooth. Shimming is expensive. All divisions have good sections—and on these good sections the men will be putting in ties about the middle of April, while on the poorer sections, where the clay is, the shims must be removed and gravel put in, keeping these sections continually behind in the work. I wish that our superior officers would see the advisability of spending more money and giving us more gravel trains.

Mr. C. B. LENTELL (Boston & Albany): I do not think that stone ballast is indispensable to a good roadbed. I believe that a good foundation of 2 ft. of gravel ballast with good drainage is sufficient. Repairs will not be expensive when this idea is carried out.

Mr. HORNER: I would like to be more emphatic in regard to shimming. Every minute spent in shimming is time thrown away. If the same amount was expended on gravel, shimming would not be necessary. The same money put into permanent ballast would make a perfect track in a short time.

Mr. GREER: I do not believe in shimming, and I move that that part relating to shimming be omitted in the discussion.

Mr. HYLAND: I think shimming will bear discussion. I have been shimming for 40 years, and consider it necessary. Track can be shimmed to be perfectly safe.

EXHIBITS.

George J. Akers, agent for Fairbanks, Morse & Co., of Chicago, exhibits the Barrett track, bridge and car jack, Fairbanks' Sheffield standard section hand car and railroad velocipedes and pressed steel wheel for hand and push cars.

Carlisle Mfg. Co., Carlisle, Pa.—Blue prints and models of Boyd's patent key-bolt frogs, patent re-enforced T bar switches, clamp frogs of various descriptions and automatic yard and main line switch stands.

Positive Nut Lock Co., Jeffersonville, O.—Samples of the positive nut lock.

C. W. Hunt Co., 45 Broadway, New York City.—Samples of stevedore hoisting rope; blue prints of coal handling machinery.

Dilworth, Porter & Co. (Limited), Pittsburgh, Pa.—Samples of the Goldie spike and specimens of the spike driven into timber.

National Lock Washer Co., Newark, N. J.—Samples of nut locks and model of a track jack.

Dunham Manufacturing Co., Boston & Chicago.—Improved Servis tie plate with three ribs.

Ruffner & Dunn, Philadelphia, Pa.—Excelsior nut lock.

George C. Dressel & Co., 715-719 East 173d street, New York—Samples of the Dressel locomotive signal lamp.

Weir Frog Co., Cincinnati, O.—Drawings of the new automatic high switch stand and die-formed steel rail braces.

Standard Railway Rail Joint Co., Boston, Mass.—Model of the standard rail joint.

Bush Interlocking Bolt Co., 133 South Fourth street, Philadelphia, Pa.—Samples and models of the new improved Bush interlocking bolt.

Page Woven Wire Fence Co., Adrian, Mich.—Samples of the Page coiled spring woven wire fencing.

Kalamazoo Railroad Velocipede & Car Co., Kalamazoo, Mich.; represented by the Montauk Railway Supply Co., 115 Broadway, New York—Blue prints and photographs of the Kalamazoo steel surface cattle guard.

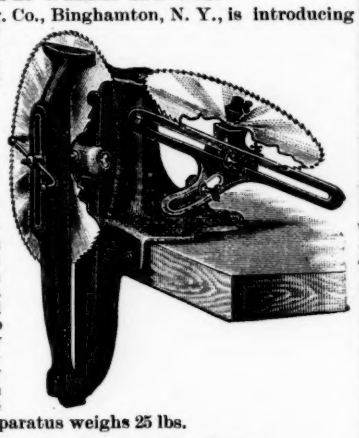
TECHNICAL.

Iron and Steel.

The strike of the employés of the New Jersey Steel & Iron Co., at Trenton, N. J, has ended, by the old employés agreeing to go back to work on the basis of the scale adopted by the Association of Amalgamated Iron and Steel Workers.

The Winkler Saw Vise.

The Stow Mfg. Co., Binghamton, N. Y., is introducing the Winkler saw vise shown herewith. It is designed for holding circular saws up to 20-in. diameter during filing and setting. The setting is done by placing the saw on an adjustable arbor, shown in the cut, which brings the teeth directly over a hardened steel plug in the top of the vise. By using a hammer a perfectly uniform set can be given to the teeth. The apparatus weighs 25 lbs.



A New Stuffing for Car Seats.

There was exhibited at the recent conventions at Old Point Comfort a knitted fabric which is intended for use in stuffing car seats and backs to take the place of curled hair. This fabric is quilted by a knitting process, and is quite different in appearance from any other textile fabric manufactured. The filling is carried and confined in an untwisted state, thus securing the softness of the natural fibre. Each section of filling is secured in separate pockets. It is not found to mat or harden, and it is claimed that the cost is much less than curled hair, as the labor in upholstering is greatly diminished, and the back of the plush is much less liable to be cut. The fabric is used

as well for mattresses, pillows, bolsters, table padding and for all upholstery purposes, and is made in all thicknesses from ⅝ in. to 3 in. It has been in use on the Delaware, Lackawanna & Western road for the past six years at the Soldiers' Home, Hampton, Va., and also at numerous hotels and institutions. It is only since the making of large additions to the works that the railroad trade has been solicited, for the reason that the capacity for manufacturing has been taxed to its utmost to fill other fields. It is made by the Knitted Mattress Co., Canton, Mass.

Downward Draft Locomotive.

The new locomotive with downward draft furnace has been run for a week, two round trips per day, on the route from Portland, Me., to Sebago Lake, 18 miles, making 72 miles each day, with baggage and two passenger cars, the record showing gratifying results. This line has many grades of about 85 ft. to the mile and the engine has steamed well and made the schedule time without exception. Several changes are to be made in details. The exhaust nozzles have been contracted to 3½-in. openings, and it was then found that some sparks were thrown, necessitating the addition of the usual extension smoke box with baffle plate and screen. The boiler carries 145 lbs. steam pressure, and with the above train the cut-off is worked in the first notch from the centre, or about 2 in. of the stroke, which is unfavorable for the quickest steaming.

The engine used less than one-half a ton of coal for the round trip and less than one ton in 24 hours, including banking over night and getting up steam in the morning. The depth of coal carried on the grate is 10 to 12 in., and slicing of the fire is not required during the round trip of 36 miles. The engine previously used was a light 40-ton engine, and burned two tons per day of 24 hours. The new engine has taken 19 long cars of coal over the road, with cut-off at 6 in. It has been noticed that the front end of the grate is insufficiently supplied with air for perfect combustion. To remedy this defect two 4-in. air pipes have been put through the sides of the fire box, with bell mouths opening to the front. The amount of water used has not yet been determined.

THE SCRAP HEAP.

Notes.

About 200 yardmen of the Wabash struck Aug. 16 because their pay was behind time. When the pay checks arrived they returned to their posts.

Missouri Pacific express train No. 3 was robbed by masked men near Sedalia, Mo., on the night of Aug. 17. It is said that about $30,000 was secured.

The Governor of New Mexico telegraphed to Washington last week for troops to protect mail trains, railroad employés having been warned to quit work and otherwise intimidated.

The demand of the switchmen on the Peoria, Decatur & Evansville for "the Chicago scale" was granted Aug. 15, after the freight traffic of the road had been blockaded for three days.

The furious tornado which struck Wilkesbarre, Pa., on Tuesday of this week, killing 15 or 20 persons, wrecked the Lehigh Valley passenger station and the Pennsylvania engine house.

The various Connecticut roads that were called to account by the Railroad Commissioners for not abolishing grade crossings according to law have replied, giving reasons for delays in various cases. The Central New England & Western claims to have complied with the law.

Cloudbursts in Colorado Aug. 13 and 15 badly washed out many miles of track. In Colorado Springs $200,000 damage was done. In Four Mile Cañon, near Florissant, the Colorado Midland had three-fourths of a mile of track displaced and two small bridges carried away. At another point it is said that 12 miles of track had to be rebuilt.

The switchmen of the Chicago, Rock Island & Pacific, at Chicago, struck on Saturday night last. Two days before the men went out because of the discharge of one of their number, and went back on the promise of the Yardmaster that he would be reinstated. This not having been done, the switchmen struck. The matter was settled on Monday.

A Santa Fe dispatch says: Travelers to the Pacific Coast have all been going over the Atlantic & Pacific Railroad lately, as owing to the washouts on the Southern Pacific in Grant County, N. M., and in Arizona, trains have been laid up for several days at a time at Deming. On the Sonora Railroad the washouts are so bad that the railroad company has equipped a stage-coach line across the washouts, which extend for over 60 miles. It will probably take several months to get the line in running order again.

Foreign Notes.

The German town Halle has an electric railroad on the Sprague system. It is owned and operated by a Berlin company, which has secured the right for a period of 29 years.

The Jaffa-Jerusalem railroad, commenced a short time ago, is in the hands of a French company—the Société Anonyme Ottomane du chemin de fer de Jaffa-Jerusalem—with headquarters at Jaffa.

In view of the national exhibition to be held at Prague Austria, in 1891, a project is on foot to build an electric street railroad, and to have it ready as one of the objects of interest. The road is to be about 2,500 ft. long.

No concession has yet been granted for building the Jungfrau railroad. The authorities have concluded to postpone this matter until the autumn, and in the meantime are gathering expert opinion as to the practicability of the undertaking.

Two submarine cables are shortly to connect England and Sweden and Norway. One of them will run from Gothenburg to Newcastle-on-Tyne. The communication thus established will be the first direct cable connection between these countries. The undertaking is in the hands of the Great Northern Telegraph Co.

Complaints continue to be made, particularly by Swiss firms, of the inefficient management of the Italian railroads connecting with the St. Gothard line. The slowness of transportation is given special prominence, and insufficient rolling stock is cited as one of the main causes. The laying of a double track on some of the principal lines is strongly urged, and is now under consideration.

Steel Cross Ties, Nickel Plated.

The Stranded Actors' Mutual Relief Association may next be expected to air their grievances and to demand of railroad companies greater uniformity in the laying of ties, so that they shall conform accurately and invariably to the stage stride. It is terribly wearing on the actors' legs to step one step of 6 in., the next of 3 ft. and then one of 12 in.; and then what a figure he makes to passengers in the passing train!—*Boston Transcript.*

Wages on the Atchison.

The following schedule of wages and rules went into effect on the Atchison, Topeka & Sante Fe Aug. 1: Passenger service—Runs of 4,000 miles a month and over, conductors $125 a month and brakemen $60 on all divisions excepting the Western, New Mexico and Rio Grande. On the Western Division, brakemen $65 a month, and on the New Mexico and Rio Grande divisions, conductors $130 and brakemen $70 a month. Runs of less than 4,000 miles, conductors $100 and $105 for the respective divisions named above, and brakemen $55, $60 and $65 a month.

Freight service—Regular runs, conductors $90 and

brakemen $60; irregular service, conductors three cents and brakemen two cents a mile on the Eastern, Middle and Southern Kansas and Southern and Western divisions; Pueblo to Denver, conductors three and one-sixth cents and brakemen two and one-sixth cents a mile; New Mexico division, Raton to Las Vegas, conductors three cents and brakemen two and one-sixth cents a mile; Las Vegas to Wallace, conductors three and one-half cents and brakemen two and one-half cents a mile; Rio Grande division, conductors three and one-sixth cents and brakemen two and one-third cents a mile.

Work-train service—Conductors $90, $95 and $100, according to divisions as named above, and brakemen $60, $65 and $80. Conductors will receive 30 cents and brakemen 20 cents per hour for 10 hours' work for each run where any run of less than 100 miles is made, and the same rate of pay for overtime in excess of 10 hours for a 100-mile run. Nothing less than 30 minutes will be paid for as an hour.

All employés shall be in the line of promotion, qualifications, etc., being taken into account, and division superintendents are required to keep accurate records of the men, noting efficiency, capability, habits, etc. If a trainman feels that he has been discriminated against in the matter of promotion he may complain to the Division Superintendent, and if he is not satisfied he may then appeal to the General Superintendent and the General Manager. No trainman shall be dismissed without just cause, and any employé dismissed shall have the right to make a written appeal to the Division Superintendent and then to the General Superintendent and the General Manager. If it shall be found upon investigation that the dismissal was without cause, such employé shall be reinstated and shall be paid for the time lost. Any employé who feels that he is, for any cause, aggrieved shall have the right to appeal to the General Superintendent and the General Manager. Dismissals without a hearing may be made for drinking, insubordination and responsibility for collisions. The company reserves the right, notwithstanding the promotion system, to employ experienced men when the good of the service requires it.

English Engineers of American Roads.

Percy Livesey, of the engineering firm of James Livesey Son, of London, is in Philadelphia. His firm, says a local paper, are the engineers of 30 railroads now in course of construction, including one in Spain, one in Bolivia, 6 in Peru, 2 in Costa Rica, 3 in Venezuela, 2 in Chili, 12 in the Argentine Republic, 6 in Uruguay and 1 in Mexico. For these roads the Allison Manufacturing Co., Philadelphia, is building 300 cars; St. Charles Car Works, St. Charles, Mo., 20; Gilbert Car Co., Troy, N. Y., 400; Rogers' Locomotive Works, Paterson, N. J., 18 Locomotives; Baldwin Locomotive Works, 13 locomotives. Five bridges are in course of construction at Phœnixville.

The New Orleans Levees.

The special committee appointed by the New Orleans Levee District Board to consider the city surveyor's suggestions as to levee building have approved his plans. The recommendations were that the levees in front of the city receive attention first, and that in the suburban portion of the city the levees be built 3 ft. above the highest water of this year, or up to the 20-ft. mark on the gauge. In the commercial portion of the city the grade of the levees should be made lower, and they should be constructed of more permanent material than earth. He recommends grand embankments on an 18-ft. grade, with a 20-ft. crown, and slopes as flat as possible.

Harbor Improvements.

Sealed tenders addressed to the Secretary of the Public Works Department at Ottawa, Can., will be received until Aug. 26 for dredging in the harbor of Belleville, Ont., in accordance with specifications.

Elevators.

Four elevators having a capacity of 33,000 bushels each are to be constructed along the line of the Morris & Brandon branch of the Northern Pacific & Manitoba Railroad. These elevators will be erected at Balda, Hilton, Wawanesa and Brandon. They will be completed this season.

Strategy or Lawlessness—Which?

DAYTON, O., Aug. 17.—Last night 75 workmen in the employ of the Pennsylvania Co. laid a track along and across Linden avenue, in one place occupying nearly the entire street. When discovered by the authorities this morning the work was nearly completed, and it was too late for an injunction. Later in the day the city commissioners employed a force of men, who tore up the track completely.

LOGANSPORT, Ind., Aug. 17.—At 4 o'clock this morning 200 Pennsylvania trackmen arrived here and in 40 minutes laid a second track of one-fourth of a mile on Canal street in the face of the protests of property-owners and in violation of a restraining order issued in 1883. Superintendent Bennett, Trainmaster Green and Supervisor Jones were arrested this evening and gave bonds.

The Welsh Strike Ended.

Representatives of the railroad authorities and the striking employes met at Cardiff on Aug. 14, and arrived at a settlement. The strike is thus ended. The men will be paid for at least sixty hours work weekly and shall not suffer from enforced holidays. Various minor concessions are also made by the employers.

LOCOMOTIVE BUILDING.

It is reported that the Canadian Pacific has placed an order for 30 new locomotives, most of them to be used on the Western lines.

The Cincinnati, Hamilton & Dayton has ordered two heavy passenger engines from the Schenectady Locomotive Works to be delivered this month and three in September. The Brooks Works are building two heavy switching engines and the Baldwin Works five freight engines.

CAR BUILDING.

The Kingston Car Works delivered 10 platform cars to the Intercolonial last week and are building a large number of others for the same road.

The Georgia Midland & Gulf has recently placed orders for 100 ventilated cars, 30 other freight cars and two passenger cars.

The Columbia & Puget Sound is having 50 new coal cars, each of ten tons capacity, built at its shops at Seattle.

The New York, Lake Erie & Western has completed a new pay car at its Buffalo shops for the Eastern lines. The car has an observation room at one end.

The Emerson Car Co. has been organized at Charleston, S. C., to manufacture a ventilating apparatus for railroad cars invented by A. S. Emerson. The capital stock is $300,000. The incorporators are A. F. Ravenel, C. S. Gadsden, C. M. Ward, J. W. Craig, J. K. P. Bryan, A. S. Emerson, F. S. Rodgers, M. Brown, and others.

The Louisville, New Orleans & Texas has placed in service a number of passenger cars built by the Barney & Smith Mfg. Co., of Dayton, O.

"The Blue Line Limited."

Some reference has been made to the cars being built by the Pullman Car Co. for the New York and Washington line of the Central of New Jersey, Philadelphia & Reading, and Baltimore & Ohio roads. The train will probably be styled the "blue line limited." The cars are painted dark blue. There are three kinds—day passenger cars, combination and baggage. They are each 70 ft long, vestibuled, and have four-wheel trucks, the wheels being 36-in., paper, steel tired. The day cars have a smoking room at one end, and a toilet room with wash basin at both ends. The combination cars are divided into three compartments, one for use as an ordinary car, the centre one for a smoking room, and the other as a baggage room. The baggage cars are used exclusively for baggage. All the cars are lighted by the Pintsch system of compressed gas, obtained from the plant in the Jersey City yard. They will be heated by the improved Baker heater. A certain proportion of the cars are owned by each road. Those owned by the Central of New Jersey will have the New Jersey state coat-of-arms painted in bright colors in the centre of the car body on the outside, while those of the Philadelphia & Reading and Baltimore & Ohio will bear the state coat-of-arms of Pennsylvania and Maryland respectively. The cars that have been received so far belong to the Baltimore & Ohio and Central of New Jersey.

BRIDGE BUILDING.

Chestertown, Md.—It is proposed to repair, at an expense of $5,000, the bridge over Chester River, or else replace it with an iron structure.

Chicago.—The Acting Engineer has advertised for proposals for the erection of the substructure of the Canal street bridge over the south branch. The bridge is to cost about $25,000, but there was appropriated only $16,000. The $9,000 deficit has now been almost wholly subscribed by private corporations. Bids will be asked for the superstructure when the substructure has been completed.

Clinton, Ia.—Bids for the new wagon bridge at this place have been received from the Clinton, Youngstown, Canton, King, Missouri Valley, Milwaukee & Chicago bridge companies. The bridge will be built near the Chicago & Northwestern bridge, the intention being to have the main span, 450 ft. in length, built above the railroad structure, and the rest on the south side of it.

Duluth, Minn.—The Board of Public Works has awarded the King Iron Bridge & Manufacturing Co., of Cleveland, the contract for the iron work of Howard's Pocket bridge for $27,100. There were six bids ranging from this amount to $28,600.

Elgin, Tex.—The Commissioners' Court of Bastrop County, at Bastrop, Tex., will receive bids until Sept. 1, for the construction of an iron bridge across Wilbarger Creek at the Osborne crossing, about seven miles from Elgin, in Bastrop County.

Fort Wayne, Ind.—The County Commissioners received bids this week for the six proposed new bridges. The bridges are all small, ranging from 26 to 70 ft. in width. The following are the descriptions of each: 1. One span 60 ft., four 15 ft. panels; depth of truss, 7 ft.; in Monroe township. 2. One span 70 ft., five 14 ft. panels; depth of truss, 8 ft.; in Monroe township. 3. One span 39 ft., three 13 ft. panels; depth of truss, 4½ ft.; on line of Jackson and Jefferson townships. 4. One span 26 ft., two 13 ft. panels; depth of truss, 4 ft.; Madison township. 5. One span 28 ft., two 14 ft. panels; depth of truss, 4 ft.; Lafayette township. 6. One span 39 ft., three 13 ft. panels; height of truss, 4½ ft.; to be built on a skew line of 3 ft. It is estimated that the six bridges will aggregate in cost $15,000. The substructures are to be of stone and the superstructures of iron. The following bids for the superstructures were submitted: King Bridge Co., of Cleveland, O., $4,220; Milwaukee Bridge & Iron Co., $3,877; Smith Bridge Co., of Toledo, $3,900; Variety Iron Works, Chicago, $4,410; Canton Bridge Co., of Canton, O., $4,016; Indiana Bridge Co., of Muncie, Ind., on plans (a), $4,200; on plans (b), $5,595. The bids on the substructures range from $11.75 to $9.75 per yard.

Kokomo, Ind.—The Lake Erie & Western is building a new iron bridge to replace a wooden structure across the Wildcat Creek.

Lyons, Ia.—The Chicago Bridge & Iron Works has been recently awarded the contract for a highway bridge to be built by the Lyons & Fulton Bridge Co., over the Mississippi River between Lyons and Fulton, Ill. The structure will be 2,650 ft. long from end to end of approaches, the river being crossed by one 200 ft. span, three 330 ft. spans, and one 360 ft. channel span, all on masonry piers, the superstructure to be of steel. C. F. Loweth, of St. Paul, Minn., is the Consulting Engineer for the bridge company.

Minneapolis, Minn.—The County Commissioners of Hennepin County have let a contract to S. M. Hewitt for the construction of a combination bridge across the channel which connects the north arm of Lake Minnetonka with Crystal Bay, where the channel is crossed by the North Shore road.

New Gretna, N. J.—Sealed proposals for the building of an iron bridge over the Mullica River, on the road from New Gretna, Burlington county, to Chestnut Neck, Atlantic county, will be received by the joint committee of the Board of Chosen Freeholders of the counties until Sept. 15. For specifications apply to Charles W. Mathis, Chairman, New Gretna.

Olympia, Wash.—Plans have been submitted to the city council for the construction of a new east side bridge. It will cost $5,000, will be 60 ft. long and 80 ft. wide. The foot-walk will be 10 ft. wide on each side, and the roadway will be 60 ft. wide.

Paola, Kan.—The County Commissioners of Miami County have advertised for proposals to build bridges at the following places. Across the Marais des Cygnes north of Osawatomie, across the Wea, east of Paola, and at White ford, on Bull Creek, in North Marysville.

Perth, Ont.—John Elliott, of St. Mary's, Ont., has recently secured the contract for the erection of two large county bridges on the townlines between Perth and Waterloo. The one across the River Nith has a 60 ft. span and iron superstructure; the other is on the Huron road, between Shakespeare and New Hamburg, and has a 30 ft. span with iron superstructure. The faced stone will be brought from St. Mary's.

Pine City, Minn.—The contract for building a bridge across the river on Second avenue in Pine City, has been awarded to Hewitte & Co., of Minneapolis, on their plans and specifications. The price is $613.

Pittsburgh, Pa.—Theophilus Sproull, Benjamin O. Tollansbee and others have formed the Fifth Street Bridge Co. and propose to build a bridge and viaduct from the foot of Fifth street, Pittsburgh, to a point on Stockton avenue, near the foot of Arch street. Some months ago O. P. Scaife and others were granted a charter by the state to erect a bridge from the foot of Fifth street to Stockton avenue and Arch street, Allegheny. Subsequently another corporation was granted the right by the state to erect a bridge across the Allegheny River, from Pittsburgh to School street, Allegheny. This grant was almost similar to the one given the other company. Neither of these companies has secured the necessary city ordinances.

Portland, Or.—The last of the large iron cylinders for the piers of the Madison street bridge has been placed in position on one of the piers which is to support the approach. The cylinders around the other piers have all been filled with concrete except six, and the work of filling the iron cylinder which forms the upper part of the pivotal pier is in progress. There is still some 12 ft. more of iron to be added to this cylinder to complete it. In a few days the false work will be finished clear across the river. The erection of the iron work is delayed by the non-arrival of the material.

Richmond, Va.—The Edge Moor Bridge works, of Edge Moor, Del., have just been awarded the contract for 1,200 ft. highway viaduct, 70 ft. high, at Richmond, for the North Side Viaduct Co., for $74,000.

St. Paul, Minn.—The Chicago, St. Paul, Minneapolis & Omaha may replace the wooden bridge over its tracks on Payne avenue with an iron structure.

San Francisco, Cal.—The Southern Pacific has adopted plans for a bridge at the intersection of Dolores and Twenty-seventh streets. The company will begin to build it as soon as the material can be obtained from the East. The bridge will be built in two spans, one 130 ft. long and the other 100 ft. The piers will be of masonry and the superstructure will be open lattice work.

Sioux City, Iowa.—Work has been commenced on the railroad and wagon bridge which the Pacific Short Line Co. will build across the Missouri River at Sioux City. The contract for the superstructure was let some time ago to the Phœnix Bridge Co., and for the substructure to Sooysmith & Co., of New York. It will be a low combination railroad and wagon bridge, with two draws.

Spartanburg, S. C.—Jesse Cannon has the contract for building a new bridge over Lawson's Fork, at Whitney Mill.

Stewartville, Minn.—E. C. Long & Co., of St. Paul, have the contract for building three bridges on the extension of the Winona & Southwestern from Stewartville. There will be Howe truss bridges at Stewartville over the Root River, at Spring Valley, and also at Le Roy.

Trenton, N. J.—The county commissioners received the following bids for the iron superstructure of various bridges: for the Miry Run bridge, in Hamilton township, which will be 70 ft. long, the bids were: Variety Iron Works Co., Cleveland, $2,185; King Iron Bridge & Mfg. Co., $2,179; Groton Bridge & Iron Co., $2,179; Wallace Iron Co., of Jersey City, $2,211; Penn. Bridge Co. Beaver Falls, Pa., $2,247; Milliken Bros. New York City, $2,300; New Jersey Steel & Iron Co., $1,998; Berlin Iron Bridge Co., Conn., $2,200; Dean & Westbrook, $2,075. The New Jersey Steel & Iron Co. was awarded the contract. The bids for the iron work on the 20 × 18 ft. bridge at Hickory Corner, over Bayard Pond, were as follows: King Iron & Bridge Co., $578; Penn Bridge Co., $529; New Jersey Steel & Iron Co., $466; Milliken Bros., $590; Groton Bridge Co., $585; Variety Iron Co., Cleveland, $503. The bids for the same bridge to be built of stone were as follows: Wenton Brown Stone Co., $9.65 per cu. yd.; William H. Dillion, $5.50 per cu. yd.; A. R. Anderson and Thomas, $5.20 per cu. yd.; Louis Cottel, $5.49, and R. M. Walton, $4.99. D. Dreston bid $1,098 for the entire work and stone abutments and iron work. The bids were referred to a committee who were instructed to award the contract to the lowest bidder. The bids for the Mercer and Somerset Junction bridge, for iron and stone work, were as follows, the bridge to have a 30-ft. span: Berlin Iron Bridge Co., $730, King Iron & Bridge & Mfg. Co., $765; New Jersey Steel & Iron Co., $643. For the stone work the bids were as follows: Samuel H. Chatten, $1,350; A. M. Walton, $829; John W. Sutphin, $1,190; S. Cadwallader, for abutments only, $820; James Duncan, $1,602.20. The contract was awarded A. M. Walton, the lowest bidder. For the iron work on the Scudder's Mills bridge, which is to be 90 ft. long, there were but two bids. The New Jersey Steel & Iron Company's bid was $1,197, and the Dean & Westbrook Company bid $1,235. The former was awarded the contract.

RAILROAD LAW—NOTES OF DECISIONS.

Carriage of Goods and Injuries to Property.

In the Federal Court it is ruled that where a shipping receipt provides a rate of indemnity on a total loss when there is only a partial loss, it cannot be made the basis of plaintiff's recovery, and where a release executed by a shipper provides for a complete and unconditional exemption of the carrier from liability on account of loss or damage to property in the course of transportation, it is void, as against public policy, and plaintiff is entitled to recover for the full value of his goods lost.[1]

In New York the Supreme Court decides that a statute which directs that under certain circumstances the bells shall ring and the whistles of locomotives shall sound, except that the requirement as to the sounding of whistles shall not apply to street crossings, does not prohibit the sounding of locomotive whistles within the limits of the city.[2]

In Michigan the Supreme Court rules that where, through the negligence of a railroad company, sparks and cinders, alive with fire, escape from its engine and set fire to a house, the company is liable for loss of life, as well as of property destroyed by such fire, without contributory negligence on the part of the party injured; and a verdict for plaintiff will not be disturbed on the ground that the jury specially found that the engine was in good repair where they also find that the engineer was careless in its management, there being some evidence to support the findings.[3]

In New York the Supreme Court holds that in an action for injuries to plaintiff's colts by a barbed-wire

fence which inclosed defendant's road, the court properly submitted to the jury whether a barbed-wire fence was such a cause of danger to plaintiff's colts running in a field adjoining defendant's road as to be a nuisance; and whether defendant was guilty of negligence in erecting such fence, or in suffering it to become out of repair; and whether the injury complained of was the result of negligence; and also whether plaintiff was guilty of contributory negligence in permitting his colts to run in the field.[4]

In New York the Supreme Court rules that where defendant was guilty of negligence in leaving an engine on a side track unattended, and with fire in it, that negligence was not the approximate cause of an injury to plaintiff, where the engine was moved to the main track by a wrong doer, and a collision ensued.[5]

In Pennsylvania the Supreme Court rules that a railroad that has appropriated for its proposed track the rear of a dwelling-house lot, thereby destroying access to the owner's outbuildings from an alley, but which outbuildings can be approached from the street in front by reducing the size of the grass plot and removing some flower beds, is not within the inhibition of a statute which prohibits the location of a railroad "through any dwelling-house, in the occupancy of the owner or owners thereof, without his, her or their consent," as the grass and flowers, though pleasant and ornamental, are not essentiai to the enjoyment of the dwelling.[6]

In New York, in proceedings to condemn land, it appeared that the petitioner's road ran to a beach much frequented as a summer resort, and furnished the transportation thereto, and that there was great need of a station, for the accommodation of passengers. Petitioner owned land at the beach, which had been leased to persons who had fitted it up as a pleasure ground, for the accommodation of visitors to the beach, and a station built on this land would destroy, in large measure, the usefulness of the place as a summer resort, whereby petitioner's business would be injured. The Supreme Court holds that petitioner was entitled to have land condemned for such station purposes, even though the land owned and leased by it was available.[7]

Injuries to Passengers, Employees and Strangers.

In Kentucky it is held by the Court of Appeals that a shipper of stock is not guilty of contributory negligence, who uses the only platform provided by the railroad company for that purpose, and is injured in so doing, though he knows it to be unsafe, if he exercises reasonable care in its use.[8]

In Massachusetts a railroad left a freight car standing on a side track and allowed a door which it knew was not properly attached to the car to remain open and unlocked, knowing that it would be an enticing object to children. A boy, 11 years old, traveling on the street in the vicinity of the side track, saw the car with its door open, and was thereby enticed to look into it, and in so doing touched the door, which fell upon him. The Supreme Judicial Court holds the railroad not liable.[9]

In Tennessee the plaintiff was employed by a firm to load cars, the use of which was offered by the railroad company, if the firm would have them moved down from the next station, where they were standing, by allowing them to run down the grade. He, with other employés of the firm, went after the cars, under the firm's orders, and, in attempting to run them down the grade, his associates failed to apply the brakes properly, whereby he was injured. The Supreme Court decides that the railroad company was not liable for his injuries, as he was not in its employ.[10]

In Kansas the Supreme Court holds that where a railroad directs and procures a trespass to be committed by a contractor and his employés constructing its roadbed, it is liable with those who committed it.[11]

In Texas a charge that, if plaintiff relied on the assurances of protection made by a yardmaster and a switchman, and the former was not in a common employment with plaintiff, but promised to look out for plaintiff, at his request, the jury must find for defendant, was held rightly refused; for, if the foreman promised to protect plaintiff, and plaintiff relied on his promise, and the foreman failed to keep it, it was no excuse for his failure that plaintiff asked others to watch also.[12]

In Massachusetts a brakeman was instantly killed while shackling cars from which sticks of lumber projected. It was daylight at the time, and the shackling might have been made safely by stooping down between the timbers, or by crossing over and making it upon the other side of the car, from which no timber projected. The Supreme Judicial Court decides that he was not "in the exercise of due care and diligence at the time," within the meaning of the statute, giving a right of action to the next of kin of an employé killed as the result of the negligence of the employer.[13]

[1] Woodburn v. C., N. O. & T. P. R. Co., 40 Fed. Rep., 731.
[2] Mayer v. New York Cent. & H. R. R. Co., 8 N. Y. Supp. 461.
[3] Rajnowski v. Detroit, B. C. & A. R. Co., 44 N. W. Rep., 335.
[4] Rehler v. W. N. Y. & P. R. Co., 8 N. Y. Supp., 286.
[5] Mars v. D. & H. Canal Co., 8 N. Y. Supp., 107.
[6] McKeesport & B. V. R. Co. v. Lyle, 18 Atl. Rep., 1,111.
[7] In re New York Cent. & H. R. R. Co., 8 N. Y. Supp., 290.
[8] White v. Cincinnati, N. O. & T. P. Ry. Co., 12 S. W. Rep., 936.
[9] McCachem v. B. & M. R. Co., 23 N. E. Rep., 231.
[10] Hanna v. C. & N. R. Co., 12 S. W. Rep., 718.
[11] Chicago, K. & W. R. Co. v. Watkins, 22 Pac. Rep., 985.
[12] Missouri Pac. R. Co. v. Williams, 12 S. W. Rep., 835.
[13] Lothrop v. Fitchburg R. Co., 23 N. E. Rep., 227.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Canadian Pacific, 2½ per cent., payable Aug. 18.
Delaware & Bound Brook, quarterly, 2 per cent., payable Aug. 12.
North Pennsylvania, quarterly, 2 per cent., payable Aug. 25.

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Albany & Susquehanna, annual, New York City, Sept. 17.
Baltimore & Ohio, annual, Baltimore, Md., Sept. 8.
Chicago, Milwaukee & St. Paul, annual, Milwaukee, Wis., Sept. 20.
Croton Valley, special, New York City, Sept. 2.
Dallas & Greenville, annual, Dallas, Tex., Sept. 6.
Dallas & Waco, annual, Dallas, Tex., Sept. 6.
Dallas & Wichita, annual, Dallas, Tex., Sept. 6.
Gainesville & Henrietta, annual, Gainesville, Tex., Sept. 9.
Illinois Central, annual, Chicago, Ill., Oct. 8.
Minnesota & Northwestern, annual, St. Paul, Minn., Sept. 3.
Nashville, Chattanooga & St. Louis, annual, Nashville, Tenn., Sept. 10.
Norfolk & Virginia Beach, annual, Norfolk, Va., Sept. 4.
Nova Scotia Midland, annual, New Glasgow, N. S., Sept. 1.
St. Louis, Alton & Terre Haute, special, Laclede Building, St. Louis, Mo., Oct. 3, to consider the sale to the Cairo, Vincennes & Chicago.
St. Louis Merchants' Bridge Terminal, special, St. Louis Mo., Oct. 1.
Toledo & Ohio Central, annual, Toledo, O., Sept. 1.
Wabash, annual, St. Louis, Mo., Sept. 9.
Western Maryland, annual, Baltimore, Md., Aug. 27.
Wilkesbarre & Western, special, Philadelphia, Pa., Aug. 25.
Wilmington & Weldon, special, Wilmington, N. C., Aug. 26, to act upon a proposed increase of the capital stock.

Railroad and Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *Roadmasters' Association of America* will hold its eighth annual convention at Detroit, Mich., Sept. 9.

The *Claim Agents' Association* of the Eastern, Middle and Southern States will be held at Chicago, Sept. 11.

The *American Association of General Passenger & Ticket Agents* will hold its thirty-fifth semi-annual meeting at Denver, Col., Sept. 16.

The *American Society of Railroad Superintendents* will hold its annual meeting in New York City, Oct. 7.

The *General Time Convention* will hold its next semi-annual meeting at the Hotel Brunswick in New York City, Oct. 8.

The *New England Railroad Club* meets at its rooms in the United States Hotel, Beach street, Boston, on the second Wednesday of each month, except June, July and August.

The *Western Railway Club* holds regular meetings on the third Tuesday in each month, except June, July and August, at its rooms in the Phenix Building, Jackson street, Chicago, at 2 p. m. The Club has adjourned until Tuesday, Sept. 16.

The *New York Railroad Club* meets at its rooms, 113 Liberty street, New York City, at 7:30 p. m., on the third Thursday in each month.

The *Central Railway Club* meets at the Tifft House, Buffalo, the fourth Wednesday of January, March, May, August and October.

The *Northwest Railroad Club* meets on the first Saturday of each month in the St. Paul Union Station at 7:30 p. m.

The *Northwestern Track and Bridge Association* meets on the Saturday following the second Wednesday of each month at 7:30 p. m. in the directors' room of the St. Paul Union station, except in the months of July and August.

The *American Society of Civil Engineers* holds its regular meetings on the first and third Wednesday in each month. at the House of the Society, 127 East Twenty-third street, New York.

The *Boston Society of Civil Engineers* holds its regular meetings at the American House, Boston, at 7:30 p. m. on the third Wednesday in each month. The next meeting will be held the third Wednesday in September.

The *Western Society of Engineers* holds its regular meetings at its hall, No. 67 Washington street, Chicago, at 7:30 p. m , on the first Tuesday in each month.

The *Engineers' Club of St. Louis* holds regular meetings in the club's room, Laclede Building, corner Fourth and Olive streets, St. Louis, on the first and third Wednesdays in each month.

The *Engineers' Club of Philadelphia* holds regular meetings at the House of the Club, 1,122 Girard street, Philadelphia.

The *Engineers' Society of Western Pennsylvania* holds regular meetings on the third Tuesday in each month, at 7:30 p. m., at its rooms in the Penn Building, Pittsburgh, Pa.

The *Engineers' Club of Cincinnati* holds its regular meetings at 8 p. m. on the third Thursday of each month at the Club rooms, No. 24 West Fourth street, Cincinnati.

The *Civil Engineers' Club of Cleveland* holds regular meetings on the second Tuesday of each month, at 8:00 p. m., in the Case Library Building, Cleveland. Semi-monthly meetings are held on the fourth Tuesday of the month.

The *Engineers' Club of Kansas City* meets in Room 200, Baird Building, Kansas City, Mo., on the second Monday in each month.

The *Engineering Association of the Southwest* holds regular meetings on the second Thursday evening of each month at 8 o'clock, at the Association headquarters, Nos. 63 and 64 Baxter Court, Nashville, Tenn.

The *Civil Engineers' Society of St. Paul* meets at St. Paul, Minn., on the first Monday in each month.

The *Montana Society of Civil Engineers* meets at Helena, Mont., at 7.30 p. m., on the third Saturday in each month.

The Civil Engineers' Association of Kansas holds regular meetings on the first Wednesday in each month at Wichita, Kan.

American Association of General Passenger & Ticket Agents.

The thirty-fifth semi-annual meeting of this Association will be held in Denver, Col., at the club rooms of the Albany Hotel, Tuesday, Sept. 16.

Civil Engineers' Club of Cleveland.

The club met Aug. 12, President Searles in the chair. Sixteen members and two visitors were present. A communication was received from the Western Society of Engineers requesting the club to appoint a committee to meet in Chicago on Oct. 14 to aid in formulating a plan for holding an International Congress of Engineers at Chicago, in connection with the World's Fair, and the President was instructed to appoint a committee of three for this purpose.

The application of Mr. George C. Lucas for membership was received.

The President announced that the "Technischer Verein" would hold a convention in Cleveland before the next regular meeting of the club. The Executive Board was authorized to extend the courtesies of the club to the visiting scientists.

The paper of the evening was by Mr. James Ritchie, on "Some Recent Constructions in Railway Bridges," but as he w s unavoidably absent it was read by Mr. Walter P. Rice. The author began by noting the increased activity in the construction of iron railroad bridges in the Southern States. The largest recent bridge of note is that being built across the Ohio River at Ceredo, W. V., by the Norfolk & Western, which will have one channel span of 518 ft., two side spans 208 ft. each, and a series of approach spans, a total weighing upwards of 3,250 tons. A large number of other bridges are in process of construction, including many plate girders, and fixed and draw spans up to 212 ft. In the Southwest considerable iron bridge construction is going on, and in the Northwest there is an increasing number of these iron bridges: also in the Northeast many bridges are building. The Maine Central road is replacing its wooden bridges by iron ones, while the New York Central is building several bridges of steel. Particular mention is made of a plate girder span of the New York Central, 115 ft. in length and 9 ft. deep, in which the web plates are placed with fibre vertical. The new swing bridge on the Lake Shore & Michigan Southern across the Cuyahoga River is described as a double track through bridge 306 ft. long, with steel eye-bars, and the balance of iron. The total weight of the superstructure is 328 tons, of the turntable 133 tons. A table of actual weights of spans from 30 ft. to 200 ft. was given. In commenting upon specifications of bridges, the author regards those by Mr. Geo. S. Morrison for the Memphis bridge as the most complete and systematic, and on account of the minuteness of their details are not susceptible of being evaded. Nothing impossible to comply with should be written in specifications, and all reasonable conditions should be rigidly enforced. The use of steel in bridges seems to be increasing, and many roads allow Bessemer or open hearth to be used, while the New York Central allows the use of open hearth only. In testing full size iron eye-bars to destruction, the writer has noticed that failure takes place near one head or the other, indicating that the material might have been injured in manufacturing, and recommends annealing the same as is done with steel bars. This might not produce the desired results, but a few experiments in this manner might be of great benefit.

After the reading of the paper there followed a discussion of the use of iron and steel in bridge construction, of kinds of steel to be used, relative lengths of plate girders, and latticed bridges and the relative merits of the pin-connected and riveted bridges.

Traveling Passenger Agents' Association.

The eighteenth annual meeting of the Traveling Passenger Agents' Association was held in Buffalo, Aug. 19. The president, John R. Wood, of Detroit, occupied the chair. The secretary and treasurer is H. C. Holabird, of Cincinnati. He reported a membership of 180, of whom about one-third were present. It was decided to meet next year on the third Tuesday in August at Lookout Mountain, Chattanooga.

PERSONAL.

—Hon. Wheelock C. Veazey, one of the Interstate Commerce Commissioners, was chosen Commander in Chief of the Grand Army of the Republic for the coming year at the recent encampment in Boston.

—Mr. M. L. Lary, of New York City, died at Clifton Springs, N. Y., last week of paralysis. He was 65 years old and had been for the last 22 years a member of the firm of Lord & Lary, of Newburg, large railroad contractors.

—Mr. L. A. McClure, who has been Car Distributer of the Chicago & West Michigan for the past two years, has resigned that position to accept one with the Louisville Southern as Chief Train Dispatcher, with office at Louisville.

—Mr. Robert W. Baxter, Superintendent of the Wyoming Division of the Union Pacific, has resigned that position. Mr. Baxter was formerly an Assistant Superintendent on the Union Pacific and has also been Train Dispatcher.

—Mr. Charles A. Ball has been appointed General Manager of the Wheeling Bridge & Terminal Railway Co. Mr. Ball was formerly Superintendent of the Georgtown & Western, and he has held responsible positions with the Brooklyn Union Elevated road.

—Mr. Clifford W. Rowland, Roadmaster of the Louisville, Cincinnati & Lexington Division of the Louisville & Nashville, was killed in a wreck at Spring Station, Ky., Aug. 13. He was a son of Col. D. W. C. Rowland, formerly General Superintendent of the Louisville & Nashville, and was one of the most popular young railroad men in the South.

—Ex-Judge Corydon Beckwith, General Solicitor of the Chicago & Alton, died at his home in Hinsdale, Ill., Aug. 18. He was born in Vermont, July 24, 1823, and was admitted to the bar in that state in 1844. In 1846 he removed to Frederick, Md., returning to Vermont in 1847, remaining there in practice until 1853, when he removed to Chicago. In 1865 he was appointed to the supreme bench of Illinois to fill out the unexpired term of Judge Caton. In 1863 he became counsel for the Chicago & Alton, and in 1873 was made General Solicitor, which position he held at the time of his death. His connection with the Alton road has been marked by the successful handling of many and intricate cases for that corporation.

ELECTIONS AND APPOINTMENTS.

Atlanta & Florida.—The annual meeting of the stockholders was held in Atlanta last week. The following directors were elected: Evan. P. Howell, E. W. Marsh, J. C. Payne, J. R. Wylie, W. A. Russell, W. L. Peel, W. Heath, R. F. Maddox, J. K. Bruner and Willis Reagan, of Atlanta; L. F. Blalock, of Fayetteville; H. C. Bagley, Americus, and President Willis Sparks, of the Macon and Birmingham. Col. R. F. Maddox was elected President, E. W. Marsh, Vice-President; J. K. Bruner, Secretary; J. W. Rucker, Treasurer, and J. Carroll Payne, Attorney.

Atlanta & West Point.—At the recent annual meeting in Atlanta, Ga., the following officers were elected: C. H. Phinizy, President; H. M. Abbett, Secretary and Treasurer. The following directors were chosen: D. N. Speer, P. Calhoun, J. W. Green, W. B. Berry, A. E. Thornton, Jacob Phinizy. A. E. Thornton succeeded Gen. E. P. Alexander as a director of the company.

Brookville, Richmond & Union City.—The company has elected the following Board of Directors: J. M. Gaar, George H. Knollenberg, J. F. Kibbey, William P. Hutton, Isham Sedgwick, James Smith, E. G. Hill, Joseph Ramsay, Jr., and B. S. Sutton. Joseph Ramsay, Jr., has been elected President; J. M. Gaar, Vice-President; Isham

Sedgwick, Secretary, and B. S. Sutton, Treasurer. Four more directors will be chosen by the towns of Brookville, Liberty and Union City.

Brownsville, Cmtintental & Northern.—Felicious San Romen, Enrique Viscay, James A. Brown, George R. Forney, James G. Brown, Joaquin Meiz, Jose Fernandez, Dometrio Salizar, James S. Wells, J. J. Upsem, have incorporated this company in Texas. The officers are: Feliciano San Roman, President; James G. Brown, Vice-President; James A. Brown, Treasurer, and George H. Tarney, Secretary, all of Brownsville, Tex.

Buctouche & Moncton.—The annual meeting of the stockholders was held at Buctouche, N. B., Aug. 12, Dr. L. G. de Bertram, John L. Harris, C. N. Skinner, J. P. Insley, A. Renaud, A. E. Killam and C. Ford Stevens were elected directors of the company. Dr. L. G. de Bertram was elected President and J. L. Harris Vice-President.

Carolina, Knoxville & Western.—At a meeting of the stockholders held in Knoxville recently the following directors were elected: W. Bailey, J. B. Humbert, W. E. Jackson, Frank Hammond, H. C. Beattie, J. W. McCullough, J. P. Phillips, W. J. Readdy, C. E. Luckey, H. J. Haynesworth, W. T. Ross, Joshua Brown and Samuel McKinney. The directors elected William Bailey, President; J. B. Humbert, Vice-President; A. B. Byrd, Superintendent; T. P. Wardlaw, Secretary and Treasurer, and W. E. Jackson, Counsel.

Chautauqua Lake.—At the annual meeting of the company, held at Jamestown, N. Y., Aug. 5, the following directors were elected: George H. Burt, Boston; Burnham G. Stickney, George Hoffman, New York; R. G. Wright, E. A. Skinner, F. B. Brewer, Westfield; A. N. Broadhead, O. E. Jones, F. E. Gifford, Erie L. Hall, John Cadwell, R. N. Marvin, Willis Tew, Jamestown. The directors elected the following officers: President, John Cadwell; Vice-President, F. B. Brewer; Secretary, D. H. Post; Treasurer, Frederick Bristow.

Chicago, Burlington & Quincy.—John Lass has been appointed Superintendent of the Galesburg division of the road, with office at Galesburg, Ill., to succeed E. M. Herr, resigned, to accept service with another company.

Chicago Elevated Terminal.—The incorporators and first board of directors are: Joseph T. Torrence, Joseph Donnersberger, Thomas W. Johnston, James J. Reynolds and Charles Eldrids, all of Chicago.

Chicago & Erie.—The Chicago & Atlantic has been reorganized under this name, and the following directors have been elected: George Ristine, George Cochran, John Todd, M D. Woodford, David Bossman, Charles Pierson, W. H. Teunis, William Coughlin, A. W. Hendricks, Albert Baker, Volney Malott and J. A. Barnard.

Chicago, Milwaukee & St. Paul.—E. M. Herr has been appointed Master Mechanic of this road, with office at Milwaukee, Wis.

Cincinnati, Jackson & Mackinaw.—F. W. Deibert, Master Mechanic of the road, has resigned, and A. H. Watts has been appointed Acting Master Mechanic, in charge of the machinery and car departments. A. H. Watts has been appointed Master Mechanic of the roadway, with headquarters at Indianapolis, vice F. M. Diebert, resigned.

Cincinnati & Westwood.—The annual meeting of the stockholders of the company was held in Cincinnati last week. The following Board of Directors was elected: James N. Gamble, J. R. Baumes, A. D. Shockley, N. G. Hildreth and Dr. P. M. Williams. The Board elected James N. Gamble, President; J. R. Baumes, Vice-President; N. G. Hildreth, Secretary, and A. D. Shockley, Treasurer.

Cleveland & Mahoning Valley.—The stockholders met in Cleveland recently and elected four directors, three for a period of three years and one for two years. Charles Pease, E. R. Perkins and E. B. Hale are directors for three years and C. G. Hickox for the two-year term. The board elected as President Judge Stevenson Burke, Treasurer, E. R. Perkins, and Secretary, E. E. Poppleton.

Findlay, Fort Wayne & Western.—Henry Dexter, W. C. Dornin and Alfred P. Boller, of New York; Jacob F. Burket, President, and Elijah P. Jones, of Findlay, O., and C. H. Roser, of Carrolton, O., are members of the new board of directors. The New York office of the company is at No. 10 Wall street.

Gadsden & Attalla Union.—The following are the officers of this Alabama road: J. M. Elliott, Jr., President and General Manager; M. L. Foster, Superintendent; R. C. Venable, Chief Engineer, all with headquarters at Gadsden, Ala.

Gadsden, Shelby & Montgomery.—The following board of directors have been elected: W. H. Denson, E. T. Martin, C. E. Payne, Jackson E. Long, E. W. Martin, J. H. G. Martin, E. P. Chandler and W. S. Riddle, all of Alabama.

Galveston, Harrisburg & San Antonio.—R. H. Innes has been appointed Superintendent of the San Antonio division, vice W. Murray, transferred to other duties. W. R Martin has been appointed Superintendent of the El Paso division vice R. H. Innes, transferred.

Holland South Shore.—The incorporators of this Michigan company are: John C. Post, G. J. Diekema, P. H. McBride, Isaac Cappon, G. J. Kollen, L. C. Mulder, W. H. Beach, H. Walsh, O. E. Yates and Geo. P. Hummer, all of Holland, Mich.

Illinois Central.—W. H. V. Rosing has been appointed Assistant Master Mechanic of the Chicago & Pontiac division of the Illinois Central, with office at Chicago. He was formerly chief draughtsman for the road.

Lake Shore & Michigan Southern.—P. S. Blodgett has been appointed Superintendent of the eastern division with headquarters at Cleveland, O., vice C. B. Couch, transferred to other duties. J. B. Meyer has been appointed agent at Chicago, vice P. S. Blodgett, transferred. D. G. Sutfin has been appointed agent at Buffalo, vice Mr. J. B. Meyer, transferred.

Lebanon, Mascoutah & Fayetteville.—The incorporators and first Board of Directors are: James D. Baker and Louis Zerwech, Lebanon, Ill.; Peter W. Lill and George Postel, Mascoutah; Stephen Vahlkamp and G. P. Wasem, Fayetteville; and Gustavus A. Koerner, Belleville, Ill.

Louisville & Nashville.—O. B. Hollingsworth, late Master of Trains on the Mobile & Montgomery division, has been transferred to the same position on the Louisville, Cincinnati and Lexington division, vice John N. Melly, promoted to be Superintendent of Telegraph.

J. B. Haylow has been appointed Chief Train Dispatcher of the Birmingham Mineral, at Birmingham, Ala., vice Virgil Walker, resigned.

O. B Hollingsworth, Master of Trains of the Mobile and Montgomery Division, has been transferred to the same position on the Louisville, Cincinnati & Lexington Division.

Louisville, New Orleans & Texas.—W. L. Davis, Chief Train Dispatcher of the road, has been appointed Superintendent of the Natchez, Jackson & Columbus road.

Louisville Southern.—Beverly W. Wrenn, General Passenger Agent of the East Tennessee, Virginia & Georgia, has been appointed General Passenger and Ticket Agent. A. V. Lafayette will continue to perform the duties of General Freight Agent.

Mexican National.—The notice announcing the appointment of Col. Richard H. Vaughan, formerly of the St. Louis, Arkansas & Texas, as Assistant General Freight Agent, with headquarters at the City of Mexico, has been issued.

New York Central & Hudson River.—W. T. McCulloch, Traveling Auditor, has been appointed Assistant Superintendent of the eastern division of the road, with headquarters at Syracuse, N. Y., vice the late Frederick P. Phillips.

New York & Massachusetts.—John A. Risedorf, formerly of the New York Central & Hudson River road, has been appointed roadmaster of this line in place J. D. Neal, resigned.

Northern Pacific.—W. H. Brimson has been appointed Assistant Superintendent of the Pacific division, with office in Tacoma, Wash. He has been for some time past Acting Superintendent of the Northern Pacific, Fergus & Black Hills line.

Northern Pacific Express Co.—The company has removed its headquarters and general offices from St. Paul, where they have been since its organization to the new Wisconsin Central building on Harrison street in Chicago.

Ohatchie Valley.—John E. Laney and Columbus Dunn, of Laney, Ala.; Felix E. Jackson, Attalla; James E. Line, Chattanooga, Tenn.; William H. Wilson and J. A. Bilbro, Gadsden, and Charles N. Jelks, Dukes, Ala., are the incorporators of this new Alabama road.

Oregonian.—Lewis Tasheira has been appointed Chief Engineer of this company, with office at Portland, Or., vice A. O. Eckelson, resigned on account of ill health.

Panhandle, Corsicana & New Orleans.—The incorporators of the company are R. S. Neblett, S. W. Johnson, A. G. Damon, James Garritty, Stephen Smith, all of Corsicana, Tex., and J. W. Morgan and Samuel R. McLean, of New York; James Lloyd, of Pennsylvania, and John Watkins, of Manchester, England.

Pecos Northern.—The incorporators are: J. J. Hagerman, Thomas H. Edsall, Charles J. Noble, Percy Hagerman, of Colorado Springs, Colo.; S. M. Folsom and John A. Lee, of Albuquerque, N. M.

Penobscot Shore Line.—This company has been organized in Portland, Me., by the choice of the following directors: Levi C. Wade, Boston; Asa T. Potter, Boston; J. S. Ricker, Deering; H. B. Cleaves, Payson Tucker, William L. Putnam and William A. Allen, Portland.

Philadelphia, Harrisburg & Pittsburgh.—The following officers have been elected: President, A. A. McLeod; Secretary, W. R. Taylor; Treasurer, W. A. Church; Directors, G. DeD. Keim, I. A. Sweigard, R. S. Davis, Albert Foster, C. H. Quarles, D. Jones.

Port Angeles Central.—The officers are: President, James Wickersham; Vice-President and General Manager, Charles W. Joynt; Secretary and Treasurer, Charles E. Taylor. The office of the company is at Tacoma, Wash.

Port Clinton Short Line.—The new board of directors consists of R. B. Bell, G. E. St. John, W. H. Payne, E. H. Brenna-, J. N. Buck, of Port Clinton, O.; H. S. Buckland, D. A. Ranck, Frank Hien and Chas. Thompson, of Fremont. The officers are: R. A. Bell, President; G. E. St. John, Vice-President; J. N. Buck, Secretary; D. A. Ranck, Treasurer.

Randolph & Northwestern Nebraska.—The incorporators are: Edwin W. Winter, E. E. Woodman, James H. Howe, Walter A. Scott, John B. Barnes and Thomas W. Moran. The headquarters are at Wayne, Neb.

St. Louis, Alton & Springfield.—M. T. Seymour, formerly connected with the Columbus, Hocking Valley & Toledo, has been appointed Superintendent of this road. The position of trainmaster has been abolished.

Saltsburg & West Lebanon.—The following are the directors of this Pennsylvania company referred to last week. President, Arnold G. Plumer, G. Herbert Millett, Frank M. Wirgman, F. R. Shattuck, J. K. Scofield, S. R. Martin, Charles Rockwell, A. Reynolds Colesberry and F. B. Owen, all of Philadelphia.

Savannah, Florida & Western.—W. B. McKee has been appointed Assistant to the General Manager and will attend to the routine business and correspondence of the office.

Shenandoah Valley.—Walter Macdowell, heretofore acting Auditor for the Receiver, has been appointed auditor, with office at Roanoke, Va.

Staten Island Rapid Transit.—P. H. Cassidy has been appointed Auditor of this company, to succeed the late H. C. Willets.

Talladega & Coosa Valley.—A. F. Besson has been appointed Auditor of this company, with office at Talladega, Ala., vice A. H. Merrill, resigned.

Tyler, Alexandria & Northwestern.—The following are the officers of this road: Gov. Hubbard, President; Capt. James P. Douglass, Vice-President; John T. Bonner, Secretary. The headquarters of the company is at Tyler.

Union Pacific.—A. L. Hawley has been appointed Division Engineer of the New Mexico division, with jurisdiction south of the Denver, Leadville & Gunnison crossing in Denver, with headquarters at Denver. William Ashton will continue as heretofore in charge of the Denver yard, and all tracks north of Denver, Leadville & Gunnison crossing.

Union Pacific, Denver & Gulf.—Herbert Smith, chief clerk of the freight department of the company, has been appointed Assistant General Freight Agent, vice F. Wild, Jr., promoted.

United Railroads of Washington.—The trustees are: T. F. Oakes, James B. Williams, H. S. Huson, W. Chapman and George Browne. George H. Earle, of New York, is Secretary, and George N. Baxter is Treasurer.

Western of Alabama.—At a meeting of the stockholders of the company held in Atlanta last week the following directors were elected for the ensuing year: C. H. Phinizy, President; Cecil Gabbett, M. H. Smith, Thomas G. Jones, E. P. Alexander, Henry C. Simple and Alexander C. King.

Wisconsin Bee Line & West Superior.—The incorporators are C. D. Smith, Frank M. Scott and James O. Ackerman, of Fond du Lac, Wis.

RAILROAD CONSTRUCTION.

Incorporations, Surveys, Etc.

Ahnapee & Western.—This company has been chartered in Wisconsin to build a road from a point on the survey of the Kewaunee, Green Bay & Western, in Kewaunee County, to Ahnapee, a distance of 14 miles. The incorporators are E. Decker, of Casco, Wis.; M. C. Haney, of Ahnapee, Wis.; C. G. Boalt, of Painesville, O; and W. J. Abrams and S. W. Champion, of Green Bay. The capital stock is $250,000.

Atlanta, West End & McPherson.—This road is to be a suburban line 4½ miles long, from a point in Atlanta near the centre of the city to the city limits and thence southwesterly to McPherson barracks. The capital stock is $75,000. The incorporators are J. H. Mountain, H. L. Woodward and R. F. Abbot.

Baltimore & Drum Point.—Work on the road is reported to be still in progress. All of the road in Calvert County is said to be graded, and in Anne Arundel County, between Millersville and the Calvert line, seven miles are yet to be graded. Five miles north of Millersville is graded, and 13 miles beyond that will soon be graded. Nearly 150,000 cross ties have been delivered on the line of the road, and others are ready for shipment to Drum Point. The money used thus far is out of the state's appropriation. Neither the counties' subscriptions nor the subscriptions of the private stockholders have been called upon yet.

Baltimore & Eastern Shore.—About six miles of track have been laid from Salisbury northwest toward Vienna on the Nanticoke River, and the entire 17 miles will be completed in a few weeks. The ballasting, however, will not be completed until about the middle of September, and it is not expected that the bridge across the Nanticoke River will be finished before October.

Bellingham Bay & British Columbia.—The contract for building this road from its present terminus on the Nooksack River to a connection with the Canadian Pacific at the international boundary line will be let during this month. The cost of completing the line on the American side will be $130,000.

Bristol, Elizabethton & North Carolina.—Durand & Co., of Chattanooga, have been awarded the contract for building 40 miles of the road from Elizabethton to Mountain City, Tenn. It is understood they will sublet the greater part of the work. The entire line from Bristol, Va., to Mountain City, a distance of 60 miles, is now under contract.

Brookville, Richmond & Union City.—This company has been organized by officers of the Cleveland, Cincinnati, Chicago & St. Louis and residents of the towns of Brookville, Liberty and Union City, in Indiana, to build the branch of the White Water road from Brookville north through Liberty to Richmond and to Union City, which was referred to in our issue of Aug. 1 in speaking of various extensions of the Cleveland, Cincinnati, Chicago & St. Louis. This route has been adopted instead of the one from Besson's to Richmond. A preliminary survey is now being made.

Brownsville, Continental & Northern.—This company has been chartered in Texas with a capital stock of $3,000,000 to build a road about 300 miles long, between Brownsville and San Antonio, passing through the counties of Hidalgo, Nueces, Duval, Live Oak, McMullen, Atascosa and Bexar.

Cape Breton.—The ballasting on the eastern section of the governmant road in Cape Breton is about completed. The contractors for the western section, Isbester & Reid, are making good headway, and they expect to have their contract finished in about six weeks.

Chattanooga Southeastern.—The survey for this road will soon be commenced between Athens, Ga., and Chattanooga, Tenn., about 150 miles. The line will pass through Gainesville and Jasper. Hall Bros., of Atlanta, are the Chief Engineers.

Chicago & Eastern Illinois.—Citizens of Sullivan, Ill., and other places in Moultrie and Shelby counties have secured considerable right of way through those counties for a projected extension of this road from Tuscola to Shelbyville, which has little prospect of being built. It is stated that a survey is being made by the company, but this is probably incorrect.

Chicago Elevated Terminal.—This company was incorporated in Illinois last week to build a four-track elevated road in Chicago, to do suburban, local and terminal business. As one of the projectors states, "the tracks will be open to all roads upon the same terms, and it is expected that it will become the great consolidated terminal line of Chicago, by which the question of rapid transit within the city will be solved." He adds: "The road will be constructed on Twelfth street, between the westerly side of the street and the south branch of the Chicago River, running south to a point on the Little Calumet River, between the towns of Blue Island and Riverdale, with a branch extending from a point on the line between Twenty-second and Thirty-first streets, southwesterly to a point where Forty-second street crosses the dividing line between Chicago and Lyons.

It is understood to be largely in the interest of the Atchison road, although to be maintained as a distinct corporation. It is proposed to build an elevated system of six tracks, with a union station at 12th street, on the south side of the city, with a capacity for eight or ten tracks. The tracks are to extend to the city limits on the south side, utilizing as right of way a large amount of property at present unimproved, owned by the Atchison, and acquiring by purchase such other property as may be required. Gen. Joseph T. Torrence, of Chicago, the president of the corporation, is quoted as saying that it is proposed to furnish terminal facilities for any line that may desire to avail itself of them on the terms proposed by the new company, presumably non-competing

lines. While the first object will be the handling of passenger traffic, Gen. Torrence says, it is also proposed to construct enclosed freight yards at grade, employing hydraulic lifts.

Chicago, Fort Madison & Des Moines.—A proposition to issue bonds to the amount of $35,000 for an extension of this road from Birmingham westerly to Ottumwa, Ia., a distance of 45 miles, was carried at an election held in the latter town Aug. 11.

Columbia, Newberry & Laurens.—A locating survey has been recently made for an extension of this road from Newberry to Clinton, S. C., about 15 miles. When the extension is built the road will parallel the Richmond & Danville from Prosperity on the present lines. Rice & Coleman have the contract for the grading. The route of the road through Newberry has not yet been decided.

Delavan, Lake George & Chicago.—The projectors of this road which it is proposed to build from Delavan to Duck Lake Station, Wis., a distance of 10 miles, are endeavoring to interest the residents of the two towns sufficiently to vote enough funds to build the road.

Denver & Rio Grande.—Tracklaying has been commenced on the branch from Villa Grove south to Alamosa, Colo., 55 miles. All the grading has been completed and the cross ties have been cut and delivered.

Gadsden, Shelby & Montgomery.—A charter has been issued in Alabama to this company, which has been previously referred to as the Gadsden & Montgomery. The road proposed is from Gadsden to Montgomery. From Gadsden it will pass through or near Pell City, St. Clair County, thence through or near Wilsonville, Shelby County, and thence to Montgomery. The capital stock of the corporation is $1,500,000.

Great Northern.—Shepard, Siems & Co., of St. Paul, in asking bids on sub-contracts on the 185 miles of the Pacific Coast extension west from Fort Assiniboine, Mont., state that the grading will be all prairie work, and largely scraper and side work, except the last 20 miles. On this section there is considerable rock. On the further extension of the line to the Pacific coast there is some heavy work and considerable rock cutting. Contractors accepting work on the line are assured of employment on the work to the westward when it is commenced, and that work is expected to occupy three years.

Hamilton & Kingston.—The contract for grading this road has been let to Watkins & Snider, of Cameron, Mo. They commenced work last week and have 70 teams employed on the grading. There is one trestle on the road about 300 ft. long and across Shoal Creek. The road is to extend from Hamilton to Kingston, Mo., about 8½ miles. The principal contractor is Judson Kingsley, of Kingston, Mo. T. M. Long, of St. Joseph, Mo., is the Chief Engineer. His present address is Kingston, Mo.

Holland South Shore.—This company has been recently organized in Michigan to build what an officer styles a terminal road at Holland, Mich., about 1¼ miles long, which it is expected to complete this fall. Several extensions are proposed, but no work has yet been done on any part of the road.

Lebanon, Mascoutah & Fayetteville.—A charter has been granted in Illinois to this company which proposes to build the road between Lebanon, Mascoutah and Fayetteville in Illinois, a distance of about 16 miles. The capital stock is $100,000. The principal office is at Mascoutah.

Lehigh Valley.—The company has placed in operation the new line from a point a few miles north of Union Springs, on the Geneva, Ithaca & Sayre, northeastly to Auburn, N. Y., about eight miles. The new branch is operated as part of the Auburn & Ithaca, and gives the latter a line about 46 miles long between Ithaca and Auburn, N. Y.

Litchfield, Carrollton & Western.—The company has accepted the agreement with the commissioners of the Sny Levee by which the company secures the use of the levee for a roadbed for an extension of its line from Columbiana, on the Illinois River, north to a point opposite Hannibal, Mo., and probably also to Quincy. The company is to raise the levee, and widen and strengthen it. Work is to be commenced about Sept. 1, and the road is to be completed by Jan. 1, 1892. The railroad company is to receive in 20 years an amount equal to about two-thirds the minimum tax which the landowners have been paying to maintain the levee.

Louisville, New Orleans & Texas.—The Helena branch will probably be placed in operation in a few days. The tracks have been laid and all the work has been finished, with the exception of the Mississippi River inclines between Glendale and Helena, Ark. These are being built by D. E. Linehan, of Dubuque, Ia. It is not expected that they will be ready until about Sept. 1. The company is building a large brick freight house in Helena, where it has its terminal station, yards, etc.

Middle Georgia & Atlantic.—The grading on the 27 miles between Machen and Covington, Ga., has been completed from the latter point northwest through Newbern to a point a few miles east of the Alcovy River, and from the latter point to Covington. The tracklaying will begin at Machen this week, and it is expected that the road will be in operation in November. Work will be commenced soon on the proposed branch from Newbern north to Social Circle, on the Georgia road, a distance of 10 miles.

Missouri Pacific.—It is stated that engineers of this company are making a survey from Malden, Mo., south through Mississippi County, Ark., and along Little River, to a connection with the Kansas City, Fort Scott & Memphis, near Gilmore, in Crittendon County.

Mobile, Jackson & Kansas City.—A subscription of $55,000 to the road was voted by the town of Jackson, Miss., on Aug. 13.

Montgomery, Tuscaloosa & Montgomery.—The contractors expect to begin tracklaying on this road in a few days on the first 50 miles from Montgomery to Maplesville, Ala., on the East Tennessee, Virginia & Georgia. Dean Berry, B. Boehmer & Co. have the contract for grading the entire line between Montgomery and Tuscaloosa, Ala., 108 miles. Most of the grading has been sublet, but there are still some sections which the contractors desire to let. There are two large iron bridges on the line, the most important being over the Alabama River near Montgomery. This has a draw span 350 ft. long, with two through spans 250 ft. long. The other bridge at Centreville has a 200-ft. span. The grading is generally average work, but there are a few heavy cuts crossing divides and one very heavy piece of work which is necessary to avoid a tunnel, which was located on the original survey. The maximum grade is 1.25 ft. and the maximum curve is six degrees.

The following is a list of the sub-contractors for grading with the number of miles awarded to each firm: John Patterson & Sons, Terre Haute, Ind., 12; James Foley, Flushing, O., 11; Carey & Pollard, 3; O. J. Pruitt, Montgomery, Ala., 5; C. W. Boyer, St. Louis, Mo., 3; W. B. Hard, Unadilla, Neb., 7; Neal & Daniels, West Point, Miss., 4; J. A. Carson, Selma, Ala., 6; J. H. Otey, Uniontown, Ala., 5; A. Stomking, St. Louis, 4; John Daniels, St. Louis, 4; J. G. Randolph & Co., Montgomery, 3; G. B. Baughan, Kirkwood, Mo., 2; K. L. Avery, Centreville, Ala., 2; W. W. Mims, 1; Gordon & Co., Prattville, Ala., 2; C. Studstill, Selma, 1.

New Orleans & Northwest.—The tracklaying on the division from the Mississippi River, at Vidalia, La., was completed Aug. 14, the last rail being laid at a point called "Pine Oak Slough," three miles north of Winesboro and 55 miles northwest of Natchez, Miss. The line from Natchez to Rayville is 74¼ miles long. The contracts are now being let for the construction of the road from Rayville north to Bastrop, La., to which points the locating surveys have been made.

Norfolk & Western.—Contractors on the extension through West Virginia have found it so expensive to get men and materials through the rough and unsettled country that several of them have abandoned their contracts, and one at least has moved his tools and teams out secretly to escape his creditors. There are no wagon roads in most of the country traversed, and all the supplies have to be hauled through the forests.

Northern Pacific.—The cross-sectioning of the Kootenai branch is progressing rapidly, and the engineers will soon have completed their task sufficiently to permit the graders to begin work. The road will run in almost a direct line north from Kootenai station, on Lake Pend d'Oreille, to Banner's ferry, Idaho. The distance is about 30 miles, and the road will be completed by November.

Northern Pacific.—The company has made arrangements with the builders of the Seattle & Northern by which it is to pay for one-half the cost of constructing the line from Anacortes to Hamilton, Wash., and to assume the interest on one-half of all the bonds issued.

The City Council of Aberdeen, S. D., has voted bonds to the amount of $50,000, to aid in the construction of a road from that city to a connection with the Northern Pacific at Oakes. It is understood that the citizens of Pierre, S. D., will build an extension of this line to that place.

North Yakima & Pacific.—A corps of engineers is now at work and will have this Northern Pacific branch line located to the headwaters of the Willapa within 60 days. This renewed activity is said to be caused by the progress of the work on the Oregon & Washington Territory road in Southern Washington. The company will push the work with all possible speed and has already ordered rails and other track material. Increased activity on the new branch lines in Southern Washington is noticeable. All contractors are being hurried, work gangs are being increased and a general impetus is being given construction work all along the line.

Ohatchie Valley.—The company has filed articles of incorporation in Alabama. The proposed road is from Piedmont to Laney, both in Calhoun County, Ala.

Ohio River.—Engineers are surveying along the Ohio River about 10 miles below Wheeling, W. Va., at a point called the Narrows, where it is proposed to relocate the line. The present line is built on trestles and has always been a dangerous part of the line, difficut to keep in repair. It is expected that the engineers will succeed in locating a line so that the road can be built on a solid bed.

Panhandle, Corsicana & New Orleans.—This company has been chartered in Texas to build a road from Fort Worth to Alexander, La., through the counties of Tarrant, Johnson, Ellis, Hill, Navarro, Freestone, Henderson, Anderson, Cherokee, Rusk, Nacogdoches, Angelina, Shelby, San Augustine and Sabine, a distance of 200 miles. The capital stock is $1,000,000.

Pecos Northern.—This road is to be an extension of the Pecos Valley line, now under construction between Pecos, Tex., and Roswell, N. M. The new road is to extend from a point on the Pecos Valley road, in New Mexico, to Albuquerque in the same state to a connection with the Atchison, Topeka & Santa Fe. The line will be about 200 miles long. The charter of the company was filed in New Mexico last week. The capital stock is $3,620,000, of which $200,000 has been paid in. The incorporators are directors of the Pecos Valley road.

Perry County.—The preliminary survey for the extension from New Bloomfield west through Elliottsburg and Green Park to Loysville, a distance of nine and one-half miles has, been completed. The work will be very light. The contracts have not yet been let.

Pittsburg, Ohio Valley & Cincinnati.—There being another railroad company called "The Ohio Valley Railway Company," the name of the road, now in part under construction, from Bellaire to Marietta, along the Ohio River on the Ohio side, has been changed foom the Ohio Valley Railway Co. to the Pittsburgh, Ohio Valley & Cincinnati Railroad Company. This road is under contract as far as Powhattan, 15 miles, which will be completed by Jan. 1, 1891, and efforts are being made to obtain local aid and rights of way with the view of extending the road to Marietta.

Port Angeles Central.—The surveys are being made for this road from Port Angeles, Wash., near Port Townsend south to a point on the Columbia River, and to Gray's Harbor and Puget Sound. The company will adopt the line which gives the most practicable route through the Olympic Mountains. The route which is preferable, and which will probably be adopted, is up the Elwha River to the Summit, and down the Skokomish River to the Columbia River. The company has six miles of terminals and yards definitely located, and will commence active construction in about 30 days. The company will do all the construction work. As now laid out, this will be comparatively easy; the grades are light, and there is little bridging. The construction of the wharfs is now going on. The future work on the through line will comprise very heavy mountain work. It is expected that the first six miles of the road will be in operation in a few months. About three miles of grading is at present completed. The principal business of the line for some time will be the transportation of timber.

Quebec Central.—The preliminary survey has been commenced for the extension from Tring Station, Que., southeast to Lake Megantic, which was referred to last week.

Randolph & Northwestern Nebraska.—The company has filed a charter in Nebraska. It is to construct a road from Randolph, Neb., in a northwesterly direction, to Fort Randall, S. D. The capital stock is $1,000,000, and the principal office will be at Wayne, Neb.

Rio Grande Western.—The contract for grading the second section of 33 miles of the Sevier Valley branch from Fairview to Manti, Utah, was awarded Aug. 11 to Crandall & Deal, of Springville, Utah. The contract for 50,000 ties has been let to Dougall & Royland, of Springville. The company is now purchasing right of way at Eureka, Utah, for the proposed Eureka branch.

River.—This is the name of a road which it is proposed to build along the north shore of the Ohio River in Indiana from Jeffersonville to New Albany, which are at present connected by the Jeffersonville, Madison & Indianapolis. The company has been chartered in Indiana with a capital stock of $150,000, and this sum it is stated will be necessary to build one bridge on the line. The directors are Col. E. A. Maginness, John and Evan Stotsenberg, Nathan Baker and Benjamin L. White.

Roanoke & Southern.—An organization called the Roanoke & Southern Guarantee Co. has been formed by citizens of Roanoke, Va., the object being to secure right of way for the extension of this road from Martinsville north to Roanoke. The company has a capital stock of $50,000 and the subscriptions have nearly reached this amount.

Rochester, Rensselaer & St. Louis.—The company claims that it will begin construction work within 60 days. The road is to extend from Rochester, through Winamac and Rensselaer, Ind., to Gilman, Ill., on the Illinois Central, a distance of 100 miles. All the surveys have been completed. Four bridges will be necessary, each being about 250 ft. long. An extension is projected from Rochester in a northeasterly direction through Warsaw and Albion to Kindallville, Ind., a distance of about 67 miles. C. E. Benjamin has the contract for both lines. The headquarters of the company are at Winamac.

Rockaway Valley.—The locating survey is being made for the extension from Peapack, the present terminus, northeast to Mendhem, in Morris County, N. J., a distance of six miles. The company has been voted a sufficient amount by the towns along the route to complete the road. A further extension to Morristown, N. J., a distance of seven miles, is proposed. Work will begin in a few days on the line from Mendhem, and it is to be finished in October.

St. Joseph & Southern.—It is stated that the Chicago, Milwaukee & St. Paul and the Wabash, have agreed to build this road between St. Joseph and Excelsior Springs, Mo., and to operate it jointly.

San De Fuca & Northwestern.—The route proposed for this new Washington railroad is through Oak Harbor, San de Fuca, La Conner, Mt. Vernon and Sedro, Wash., up the north bank of the Skagit River, and connecting with the Fairhaven & Southern at Sedro and the Seattle, Lake Shore & Eastern. Applications for subsidies have been made to several of the towns on the route. The route is 40 miles long.

Seattle, Lake Shore & Eastern.—On the northern branch the track has been completed to the Pilchuck River, four miles north of the Stillaguamish. At this point a trestle is to be built a quarter of a mile in length. It will require nearly a month to complete it. From Sedro north the rails have been laid a distance of nearly four miles, and thus far this month 1,000 tons of rails have been shipped to Sedro for the line north. During the coming month 1,000 tons more will be sent to that point. A locomotive has been shipped to Sedro for use in the construction work north. A large force is at work on the bridge across the Fraser River, and the contractors promise that it shall be completed in time for the passage of the first trains going over the road from Seattle to the boundary.

Seattle Terminal.—Rails are being laid on this new line from Seattle to West Seattle, Wash., and will be completed within a week.

The short road being built by G. H. Elsbury from Centralia, Wash., to reach coal mines in that vicinity owned by him is now completed and ready for tracklaying.

Sherman, Denison & Gulf.—J. P. Hughes, of Fort Worth, Tex., who has the contract for building this line, has now about 200 men and teams at work, and a larger number will soon be employed. The grading will be heavy at many places, but it is expected that tracklaying will begin early in September.

South Bound.—Sub-contracts have been let to L. P. Harper & Co., George Strobhart, Curry & Co., W. J. Winn and G. A. Wilkins, for graduation; to T. J. Brown and Von Eberstein & Co., for trestling; to E. R. Bruton & Co. and A. D. Curry for cross ties, and to J. S. Oliver & Co. for tracklaying. The tracklaying will probably start about Sept. 15. The maximum curve is six degrees and maximum gradient one per cent. The work is generally light from Savannah to Barnwell, S. C., but will be fairly heavy from there to Columbia. There will be two iron bridges, one 500 ft. long, with a 250 ft. draw span over the Savannah River and one (not located) over the Congaree River, about three miles of continuous pile trestle through the Savannah River swamp. The road will be built and equipped by the Savannah Construction Co., which has a capital of $750,000. Rail fastenings, switches, etc., and some of the equipment have been already purchased.

The road will cross the Savannah River from Georgia into South Carolina, about 35 miles north of Savannah, near Sister's Ferry. The route has not been located beyond this point, but it will probably be through Allendale, Barnwell and Blackville, to Columbia, S. C., absorbing as a part of its through line the Barnwell road from Barnwell to Blackville, S. C.

Southern Pacific.—A survey is being made from Martinez south to Concord, connecting at that point with a survey made from Avon through the San Ramon Valley in Contra Costa County, Cal., to a connection at Livermore with the Southern Pacific.

South Lake & Germantown.—This company has been incorporated in Georgia by residents of Savannah, Ga., to build the road, described some week ago, from Savannah to the Vernon River. The capital stock is $75,000.

Stockton.—The company has been incorporated in California to construct a road from tidewater at San

Francisco through Alameda, Contra Costa and San Joaquin Counties to Stockton. The length of the proposed road is 75 miles. The directors are: Louis A. Garnett, Jesse Walton, John Hewestou, Jr., Robert Simson, Richard W. Reading, Frederick Homer and J. P. Hopkins. The capital stock is $2,250,000, of which $75,000 has been subscribed.

Ticonderoga.—P. W. Clement, of Rutland, Vt., is building a road for this company from the village of Ticonderoga, N. Y., to a connection with the Delaware & Hudson Canal Co. The length of the line will be between two and three miles, and it is expected that it will cost $60,000 to build. C. H. De Lano, of Ticonderoga, is President.

Tyler, Alexandria & Northwestern.—The projectors of this road have asked the counties through which it is proposed to build the line to vote the company a subsidy of $1,000 per mile of road built within the country limits, 10 per cent. payable at once for the expenses of a preliminary survey. The survey will begin at Gainesville, Cooke County, and will pass through the towns of Denton, Collin, Rockwall, Kaufman, Van Zandt, Smith, Rusk, Shelby, San Augustine and Sabine.

Union Pacific.—The tracklaying for the standard-gauge track of the Utah & Northern is progressing rapidly and is being laid from both terminal points. About half a mile a day is being finished from Ogden and 1¼ miles south from McCammon, Idaho. This latter work is on the new part of the line. Between Ogden and Collinston, 41 miles, the rails are being laid alongside of the narrow-gauge track. From Collinston north to McCammon an entirely new roadbed has been built, in a nearly direct line. The road will be shortened fully 20 miles and the grades reduced from 116 to 35 ft. The contractors have 500 men at work on the grading, and the company has a similar number engaged on building the bridges and laying the track. The present line now extends from Collinston easterly to Logan, and thence north to Hyde Park, Smithfield, Richmond and Preston, and thence to McCammon. It it proposed to build a standard-gauge branch from the main line to Preston, about 40 miles, and this may be continued in the future from the latter point over the old roadbed to a connection with the new main line.

Winona & Southwestern.—E. C. Long & Co., of St. Paul, have been awarded a contract for the bridges on the extension of this road from Stewartville. Dennis Galligan, who has the contract for the first 30 miles, from Utica to Stewartville, Minn., has the grading completed on 20 miles from the former place. The bridges have also been erected on this section, and tracklaying will be begun in a few days by J. N. McInerny, of Minneapolis, who has the contract for this work on 68 miles of the road, from Utica to the connection with the Chicago, St. Paul & Kansas City, in Iowa.

Wisconsin Bee Line & West Superior.—The articles of incorporation of this company were filed in Wisconsin last week. The road is to extend from Milwaukee to the city of West Superior, on Lake Superior. The entire length of the road will be about 360 miles. The capital stock is $3,000,000.

GENERAL RAILROAD NEWS.

Baltimore & Ohio.—The statement of earnings and expenses for July, 1890, approximated, compared with July, 1889, shows: Earnings: 1889, $1,934,670; 1890, $2,033,725; increase, $105,055. Expenses: 1889, $1,302,444; 1890, $1,458,368; increase, $155,924. Net earnings: 1889, $632,226; 1890, $581,357; decrease. $50,869. Earnings and expenses for the 10 months of the fiscal year 1890, compared with the same months of the fiscal year 1889, are: Earnings: 1889, $17,118,041; 1890, $19,805,428; increase, $2,687,387. Expenses: 1889, $12,355,718; 1890, $14,031,243; increase, $1,675,525. Net earnings: 1889, $4,762,323: 1890, $5,774,185; increase, $1,011,862.

Central of New Jersey.—The company has filed in New Jersey a discharge of its first mortgage for $5,000,000, given Dec. 15, 1868, to Moses Taylor and John C. Green, of New York, the bonds secured by the mortgage being payable this year.

Chicago & Atlantic.—The sale of this road, which occurred last week at Indianapolis, has been confirmed by the courts in Indiana, Illinois and Ohio, and a new company has been organized, called the Chicago & Erie, to operate the line.

Chicago, Rock Island & Pacific.—Justice Miller, of the Supreme Court, last week decided the application for an injunction on the part of the Chicago, Rock Island & Pacific, to prevent the Denver & Rio Grande from interfering with the former's use of the Denver terminals of the latter road, in favor of the Rock Island. A temporary injunction was granted. The case will now go to regular trial. It grew out of a disagreement over the provisions of the contract between the two roads for the use of the Denver & Rio Grande from Colorado Springs to Denver. The Rock Island formerly sent all their traffic to Denver through Colorado Springs over this line. By a contract with the Union Pacific all Denver traffic is sent from Lemoir, Colo., over the Kansas Pacific, the Rock Island using the Denver & Rio Grande trains for this traffic the same as that shipped on the latter's line from Colorado Springs. The Denver & Rio Grande gave notice that this must be discontinued. To prevent this interference the application for an injunction was made, and as the court holds that the contract is not a traffic agreement, but gives joint possession of the line to the roads, the Rock Island may use it as it desires.

Denver & Rio Grande.—The following statement shows the earnings for June and the seven months to July 30:

Month of June.	1890.	1889.	Inc. or dec.
Gross earn	$756,608	$696,205	I $60,403
Net earn	324,390	335,461	D. 11,017
Jan. 1 to July 30.			
Gross earn	$3,891,852	$3,574,320	I. $316,532
Net earn	1,530,710	1,303,335	I. 227,375
P. c. of oper. exp	60.66	63.54	D. 2.88

The increase of expenses for the month of June of this year, as compared with 1889, is due to heavy repairs to round-houses and shops in connection with the standard-gauging improvements, to an increase of 23 per cent. in engine mileage, to car repairs, to delay of traffic owing to a washout on June 1, and to general expenses contingent upon the close of the year, as the fiscal year of the company now ends June 30 instead of Dec. 31, as heretofore.

Green Bay, Winona & St. Paul.—In the United States Court at Milwaukee, Wis., the Judge issued an order confirming the Farmers' Loan & Trust Co., of New York, in possession of this road as receivers. The trust company was the trustee named in the trust deed executed on Sept. 1, 1881, to secure bonds to the amount of $1,600,000. A bill in equity was filed by the trust company setting forth that the interest had been unpaid since August 1888.

Kansas City, Memphis and Birmingham.—The company has executed a mortgage on all its property in favor of the Memphis Equipment Co. to secure the payment of $1,000,000 of bonds bearing six per cent. interest, to be issued to provide for new rolling stock. Of this amount only $250,000 will be issued at present.

Louisville, New Orleans & Texas.—The company has filed in Mississippi for record three mortgages as follows: To the Metropolitan Trust Co. of New York for $20,550,000, to secure that amount of first mortgage bonds; to the Union Trust Co. of New York for $16,900,000, also to secure first mortgage bonds, and to the same company for $7,894,000, to secure second mortgage bonds. These mortgages include the whole line of road from Memphis to New Orleans, and all branches.

Penobscot Shore Line.—This company has been organized in Maine by the purchasers of the Knox & Lincoln and that road will hereafter be operated as the Penobscot Shore Line. It was expected that the transfer of the road to the new company would be formally made this week.

Pittsburgh, Cincinnati, Chicago & St. Louis.—At the special meeting in Indianapolis, Aug. 12, the stockholders of the Chicago, St. Louis & Pittsburgh, Pittsburgh, Cincinnati & St. Louis and Jeffersonville, Madison & Indianapolis voted in favor of the consolidation of the road under the above name, under the terms already published. The vote in favor of the consolidation was 186,000 shares and against it, 687 shares.

Union Pacific.—The earnings and expenses of the entire system for June and the first half of the year were as follows:

Month of June.	1890.	1889.	Increase.
Mileage	8,023	7,840	188
Gross earn	$3,910,078	$3,416,699	$493,379
Oper. exps	2,377,974	1,925,280	452,694
Net earn	$1,532,104	$1,491,419	$40,685
Jan. 1 to June 30.			
Gross earn	$20,715,935	$17,420,908	$3,295,027
Oper. exps	14,664,500	11,591,522	5,072,978
Net earn	$6,051,435	$5,829,386	$222,049

The statement of three of the lines of the system for the same periods was:

OREGON SHORT LINE & UTAH NORTHERN.

June.	1890.	1889.	Inc. or dec.
Mileage	1,399	1,396	I. 3
Gross earn	$671,512	$563,500	I. $108,012
Oper. expen	402,616	290,800	I. 111,816
Net earn	$268,896	$272,700	D. $3,804
Jan. 1 to June 30.			
Gross earn	$3,523,560	$2,858,737	I. $664,823
Oper. expen	2,393,578	1,654,286	I. 739,292
Net earn	$1,129,982	$1,204,451	D. $74,469

OREGON RAILWAY & NAVIGATION.

June.	1890.	1889.	Inc. or dec.
Mileage	1,029	875	I. 154
Gross earnings	$438,734	$404,823	I. $33,910
Operating expenses	219,933	230,531	D. 10,598
Net earnings	$218,801	$174,292	I. $44,509
Since Jan. 1.			
Gross earnings	$1,866,365	$1,967,108	D. $100,743
Operating expenses	1,795,175	1,367,610	I. 427,535
Net earnings	$71,190	$599,468	D. $528,278

UNION PACIFIC, DENVER & GULF.

June.	1890.	1889.	Inc or dec.
Mileage	1,386	1,385	I. 1
Gross earn	$523,543	$385,589	I. 137,954
Oper. Expen	356,491	288,706	I. 67,783
Net earn	$167.049	$96,883	I. $70,166
Since Jan. 1.			
Gross earn	$2,638,646	$2,000,626	I. $638,020
Oper. expen	1,869,275	1,637,752	I. 231,523
Net earn	$769,371	$362,874	I. $406,497

TRAFFIC.

Chicago Traffic Matters.

CHICAGO, Aug. 20, 1890.

The most important meeting of the week was that of the Western lines, at which was considered the recent order of the Interstate Commerce Commission ordering a reduction in grain and flour rates, the order of the Kansas Railroad Commissioners ordering reductions in the state tariffs and the Iowa Commission's order in regard to joint rates. The lines were fully represented both by their legal and traffic departments, and the orders were freely discussed. A large majority of the lines were in favor of disregarding the order of the Interstate Commission, but two of the roads announced that they were not then in accord with this plan, and expected to put the Commission's rates in force on Sept 1. As such action would necessarily affect the other lines, the meeting adjourned until to-morrow without taking definite action. Action under the Kansas and Iowa orders was also postponed until the regular September meeting of the Western Freight Association, it being understood that each line was at liberty in the meanwhile to take such action as it saw fit, advising the Chairman under association rules. If it is finally decided to conform to the orders, it will necessitate a readjustment of tariffs which have just been lined up in accordance with the new scale of rates which take effect next Monday.

The Central Traffic Association has adopted the following resolution in regard to the uniform bill of lading:

Reso'ved, That the words "not negotiable" be stricken from the uniform bill of lading, issued eastwardly, taking effect immediately, but that each and all the other clauses and conditions thereof continue in use and unaltered until changed by the permanent committee on bills of lading and the joint committee under their respective rules. The shippers are still dissatisfied with the bill, and are agitating the formation of a federation to protect their interests in the matter. The matter was still further discussed at the regular meeting of the Chicago Committee on Monday, and the action of the association confirmed.

The Central Traffic lines have again gone over the dressed beef question, but with no better result than before. The Grand Trunk still maintains that the rates should be 48 cents with a differential of three cents in its favor. This the Lake Shore continues to oppose. In consequence of a failure to advance the dressed beef rates, the live stock rate was not discussed. Rates on pig iron and articles of iron manufacture were ordered from fifth and sixth classes to fourth and fifth classes, taking effect Sept. 1. Chairman Blanchard was instructed to request the Interstate Commerce Commission to reopen the Proctor & Gamble soap case for a rehearing.

The Western Passenger Association has decided to make the return portions of the G. A. R. Boston excursion tickets good until Sept. 30. It was at first agreed that this might be done by special request on the agent of the line in Boston in special cases, but owing to a confusion in dates on the Eastern lines the permit has been made general.

The Central Traffic Association has given notice that in consequence of the very low rates now prevailing on traffic to and from points in Texas and Louisana, and taking effect immediately, all arrangements for making through rates and divisions to and from those points are suspended, and until further notice local rates will be charged between junctions with Southern lines and all Central Traffic points.

Traffic Notes.

The average detention of cars in the Western New York (Buffalo) Car Service Association in June was 2.28 days, and in July 2.11 days.

The Baltimore Corn and Flour Exchange has entered an urgent protest against the collection of demurrage by the new Baltimore Car Service Association.

The "Big Four," which a few months ago introduced one-cent-a-mile tickets for employés' families, has abolished them, and passes are to be given as formerly.

The "Big Four" has issued regulations for the free transportation of local passengers' baggage, similar to those of the Pennsylvania, printed in the *Railroad Gazette* of Aug. 15.

The Attorney General of Iowa has given an opinion that a re-enactment of the State law relative to the Inter-State shipments of liquors is unnecessary, the recent act of Congress having the effect of making such liquors subject to the existing law.

A through passenger rate of $19 first class and $17 second class has been made from Chicago to Boston over the Wabash and the Rome, Watertown & Ogdensburg roads. The announcement does not specify the Canadian and New England connections.

A Tacoma paper says that a carload of ironwork from the East for the water works in that city was "missing" for three months, and that the workmen waiting to use this material waited a month for the car, finally discovering it by making a tour through Oregon. The car was found at Huntington Aug. 2.

The "original package industry" has received a severe blow in Pennsylvania, says a Pittsburgh despatch. The Pennsylvania Company has refused to carry certain original packages shipped from the state of Ohio into Pennsylvania. The liquor was shipped in single quart bottles, packed in small boxes, into which each bottle fits snugly. In one week Leechburg and Blairsville received 600 little boxes, or 600 quarts, of low-grade whisky. It was shipped from Canton, O. The ground taken by the company is that it will not connive at any infraction of the law, and it was believed that in carrying such business aid was given to illegal traffic.

An Arrest for Influencing Traffic by Passes.

Mr. D. B. Martin, General Passenger Agent of the Cleveland, Cincinnati, Chicago & St. Louis, was arrested at Cincinnati, Aug. 15, by a special agent of United States Commissioner Williams, of Cleveland, on a charge made by the Interstate Commerce Commission, that for the purpose of influencing a party of teachers to go to the National Educational Convention at San Francisco in July, 1888, Mr. Martin gave free transportation to L. W. Day, superintendent of the Cleveland schools, and to Mr. and Mrs. N. C. Stewart, also of Cleveland. Mr. Martin waived examination and was bound over in $1,000 to appear before the United States Court, which convenes in Cleveland in October next. The complaint was filed by William Kretchner, special agent of the Interstate Commission. David M. Hearst, said to be a discharged employé of the road, gives the information.

Party Rates.

In the report of a meeting of the Trunk Line Association in New York on Tuesday it is stated that party rates at 2 cents a mile for parties of 10 had been adopted, and that this action overruled that of the Pennsylvania in announcing such rates for parties of 7.

Texas Rates.

The representatives of Texas lines have unanimously agreed to raise all rates to common points in Texas from the seaboard, St. Louis, New Orleans and Galveston to the rates in effect July 1. The advanced rates go into effect Sept. 1, and are an increase of about 15 per cent.

East-bound Shipments.

The shipments of east-bound freight from Chicago by all the lines for the week ending Saturday, Aug. 16, amounted to 56,438 tons, against 58,945 tons during the preceding week, a decrease of 2,507 tons, and against 47,400 tons during the corresponding week of 1889, an increase of 9,038 tons. The proportions carried by each road were:

	W'k to Aug. 16.		W'k to Aug. 9.	
	Tons.	P. c.	Tons.	P. c.
Michigan Central	6,466	11.4	7,658	13.0
Wabash	4,337	7.7	3,642	6.2
Lake Shore & Michigan South.	8,682	15.4	10,720	18.2
Pitts., Ft. Wayne & Chicago	5,782	10.2	8,111	13.7
Chicago, St. Louis & Pitts	7,088	12.6	6,751	11.5
Baltimore & Ohio	3,444	6.1	3,660	6.2
Chicago & Grand Trunk	7,820	13.9	6,845	11.6
New York, Chic. & St. Louis	6,789	12.0	5,958	10.1
Chicago & Atlantic	6,030	10.7	5,600	9.5
Total	56,438	100.0	58,945	100 0

Of the above shipments 1,743 tons were flour, 23,429 tons grain, 1,243 tons millstuffs, 5,972 tons cured meats, 6,352 tons lard, 7,863 tons dressed beef, 1,486 tons butter, 2,187 tons hides, 808 tons wool, and 6,352 tons lumber. The three Vanderbilt lines carried 38.8 per cent., while the two Pennsylvania lines carried but 22.8 per cent.